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PLANTING THE SEED OF THE KINGDOM

CHAPTER I

THE SEED OF THE KINGDOM

## PART I







**COOPERATIVE**

**PLANT PEST CONTROL**

**PROGRAMS**

**FISCAL YEAR 1965**

Plant Pest Control Division  
Agricultural Research Service  
United States Department of Agriculture



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Issued February 1966



## COOPERATIVE PLANT PEST CONTROL PROGRAMS FISCAL YEAR 1965

## INTRODUCTION

The Plant Pest Control Division acts for the U.S. Department of Agriculture which is authorized to join interested States and the Republic of Mexico in programs to suppress or eradicate agricultural plant pests that include insects, diseases, and nematodes. Emphasis is placed on pests of foreign origin and those native pests capable of sudden outbreaks which individual growers cannot control. All organized programs to confine, suppress, or eradicate plant pests are cooperative with the States or parties concerned.

Division activities cover five basic functions: (1) Survey and Detection Operations, (2) Cooperative Control Operations, (3) Regulatory Operations, (4) Methods Improvement, and (5) Pesticide Safety and Monitoring Operations.

Division surveys fall into two broad categories: (1) The cooperative economic insect survey program to provide current information on insect distribution and abundance and prompt detection of newly introduced agricultural pests, and (2) surveys conducted in connection with the Division's cooperative control programs.

The cooperative insect survey program, a Federal-State undertaking is national in scope and dependent upon the full cooperation of the State agricultural agencies in the 50 States. In addition to general insect survey operations and special service surveys, emphasis is placed on the early detection of insects not known to occur in the United States. The coordination of cooperative program surveys between regions includes more than 20 plant pests that are subject to control, eradication, and regulatory programs.

The control and eradication programs include the application of pesticides with aircraft or ground and manual equipment and fumigation treatments. Cultural practices, resistant varieties of crops, the use of biological agents and other approved methods of control are used and encouraged as an integral part of the Division's suppression or eradication programs.

The regulatory activities involve the enforcement of the regulations established under Federal domestic quarantines to prevent spread of plant pests through the movement of any commodities capable of carrying plant pests over long distances in interstate commerce.

Programs conducted by the Plant Pest Control Division have one or more of the following objectives:

1. Eradication of incipient infestations of introduced agricultural pests.
2. Suppression of widely distributed insects and plant diseases that assume outbreak portions periodically, causing extensive agricultural losses, that cannot be controlled effectively by individual effort.
3. Prevention of spread of destructive pests of foreign origin that have become established in limited areas of this country.

Through methods improvement work, new and improved control materials, equipment and techniques are developed to improve the operating procedures as well as the safety of plant pest control programs. Field tests are conducted during control operations of the various programs using new materials that have shown promise in research studies. Efforts are directed toward the development and use of lures, sterilizing agents, microbial organisms, and various biological control techniques to improve pest control procedures.



Pesticide safety and monitoring activities of the Division include: (1) Determining the effects of normal agricultural pesticide use on the environment, (2) determining the side effects of large-scale control programs, and (3) the investigation of accidents and incidents where agricultural pesticides are involved. Special studies designed to determine existing pesticide residue levels in soil, water, crops, livestock, and certain species of aquatic and terrestrial animal life are being conducted.

Reviews of program activities and accomplishments have been summarized on the following pages.

## COOPERATIVE FEDERAL AND STATE PROGRAMS

### BARBERRY ERADICATION

Good progress continues on the cooperative program to remove susceptible barberry plants from the 19 Northern States. This leaves less than 30,430 square miles in the eradication area needing one or more inspections to be sure that the barberry bushes have been eradicated. The most active programs are in Illinois, Iowa, Kansas, Michigan, Missouri, Ohio, Pennsylvania, Virginia, and Washington. During fiscal year 1965, 3,551,080 rust-susceptible barberry bushes were destroyed on 2,325 properties in 17 States.

In the future more emphasis will be placed on completing work remaining in the more open grain-producing counties. This will mean some of the work in the more heavily timbered counties will be delayed and some reinfestation will occur. However, with the limited funds in some States, this plan will result in the most productive use of available resources.

The annual inspection of nursery and dealer establishments was made to certify barberry stock for interstate shipment. A total of 778 firms qualified and were authorized to ship approved species and varieties of barberry and mahonia.

A number of new herbicidal materials were tested for use in both native and vulgaris areas. Several candidate chemicals show promise of being better than those in current use.

Losses from stem rust of wheat were generally light in 1964 although there were some localized damage. These losses for the year were 3 percent in South Dakota, 2 percent in Oklahoma, and 1 percent each in Indiana and in North Dakota. Oats were not measurably affected and little or no damage occurred to barley and rye. Races 56 and 15 B-2 were the dominant wheat stem rust races and 6 F and 6 AF the dominant oat stem rust races. The spring wheat varieties, Justen and Crim, are resistant to these wheat races but most commercial winter wheat varieties are susceptible. Three relatively new varieties of winter wheat developed at the University of Nebraska proved superior in stem rust resistance this year. Most of the current commercial oat varieties are susceptible to race 6 AF, which made up 25 percent of the isolates this year. There are, however, lines with resistance available for the breeding program.

### BOLL WEEVIL

The boll weevil has been a serious factor in cotton production in the Presidio Valley since 1953. Migrations from this area have also become a threat to the cotton-producing areas of Arizona, California, New Mexico, and western Texas. In 1961 destructive boll weevil populations had moved near the Texas High Plains and by 1963 had infested an extensive area along the edge of the High Plains. This



caused serious concern among cotton growers in the Texas High Plains where 2,000,000 acres of irrigated cotton produce about 15 percent of the Nation's cotton crop. The cooperative effort to stop the westward spread of the boll weevil was continued in the Rio Grande Valley of Texas and Mexico and in Sonora, Mexico, and a new program was initiated in the fall of 1964 to protect the cotton grown in the Texas High Plains.

The Plant Pest Control Division in cooperation with the Entomology Research Division, ARS, and Texas A. & M. University began a series of field tests in the summer of 1964 at Harlingen, Tex., using undiluted malathion at various rates. It was found that malathion applied at rates from 9 to 18 fluid ounces gave results equal to one-half pound of methyl parathion and other materials applied in 3 gallons of water to the acre.

Similar tests were conducted on the High Plains with the same excellent results. After examining the data obtained from these field tests, it was decided to use technical malathion applied at the rates of 10 to 16 ounces per acre in both programs, depending upon temperature and condition of weevils in the field.

Multiple fall treatments totaled 8,885 acres in Sonora, Mexico; 7,078 on the Texas side of the Rio Grande Valley; 11,781 on the Mexico side of the Rio Grande Valley; and 1,143,742 on the Texas High Plains. Followup surveys have shown significant reductions in the overwintering adult populations in the treated areas.



Secretary Freeman, Mr. Burgess, and Dr. Irving discuss advantages of low-volume application.



## BURROWING NEMATODE

The cooperative Federal-State burrowing nematode program in Florida has two main objectives: (1) To prevent further spread of this pest in groves by establishing barriers around infested areas and (2) to eradicate existing infestations as rapidly as possible. The State of Florida is responsible for the control and regulatory phases of the program and the Plant Pest Control Division is responsible for field surveys and processing of root samples.

Intensive surveys were continued during the year to guide control operations. Nurseries were inspected to determine compliance with regulations for movement of products. The laboratory in Florida processed 144,206 samples. In Texas, 823 samples were processed from nurseries in the citrus-producing area. New techniques for ground and air detection of citrus decline to reduce costs and improve methods of finding new infestation in citrus groves are being studied.

Research on the burrowing nematode problem is conducted cooperatively by the Agricultural Research Service and the Florida Citrus Experiment Station. Two principal lines of research are in progress: (1) An in-place treatment of citrus trees that will kill the nematodes without injuring the tree and (2) the search for commercially acceptable rootstock resistant or tolerant to burrowing nematode. In 1964, the Citrus Experiment Station at Lake Alfred, Fla., released three rootstocks: "Milam" and "Ridge Pineapple," classed resistant, and "Estes," rated tolerant. If one or more of these rootstocks prove suitable from all horticultural aspects, the problem of spreading decline will be limited to the citrus acreage remaining on susceptible stock.

Since the beginning of the program 1,823 groves in Florida have been found infested, and trees from 6,827 acres have been removed and the ground fumigated. Barrier zones totaling 209 miles have been established around 795 infested groves.



Laboratory technician drawing sample from a funnel used to remove burrowing nematodes from root sample.



## CEREAL LEAF BEETLE

The cereal leaf beetle, Oulema melanopa, was found for the first time in Illinois during the early summer of 1965. Surveys revealed several new counties in Indiana, Michigan, and Ohio. At the close of the year it had been found in 3 counties in Illinois, 38 in Indiana, 43 in Michigan, and 49 in Ohio.

The joint Federal-State control program initiated in the spring of 1963 to suppress populations and minimize spread has been continued. During fiscal year 1965 more than 33,000 acres in Indiana and over 382,000 in Michigan were treated. Except for a small amount of Sevin used in Indiana, fields were treated with a low-volume formulation of malathion.

Enforcement of quarantine regulations controls the movement of articles capable of transporting the beetle to noninfested areas. These regulations require that designated articles and commodities, considered hazardous from the standpoint of spread, are treated, handled, or processed to eliminate infestation prior to movement from the regulated areas. Some of the most commonly used certification procedures involve the treatment of grain with malathion and the fumigation of hay and straw with methyl bromide. Other commodities are certified on the basis of a negative inspection or after a specified length of time in storage.

At the Methods Improvement Laboratory in Niles, Mich., efforts are directed toward the development of treatments to expedite certification and movement of hazardous material from regulated areas. Knowledge gained from investigations on the mortality of adult beetles following normal harvesting, processing, or storage has made it possible to adjust the regulatory procedures that allow certification of hay and small grains following a specified period in storage.

Cereal leaf beetle research by State personnel included extensive field testing to evaluate various types of nozzles for spray equipment. Studies are continuing to determine sources of resistant varieties of grain. Lures are being screened to find an attractant for the adult cereal leaf beetle. Increased emphasis is being placed on mass rearing techniques for several parasites that show some promise.



BN-171214

Damage caused by cereal leaf beetle larvae.



## CITRUS BLACKFLY

Control work south of the border in Mexico has prevented the citrus blackfly from becoming reestablished in the United States. The program includes the use of chemical control treatments to prevent northward spread from areas in Mexico near the United States border, biological control in areas removed from the border, and strict enforcement of quarantine regulations.

Inspection of over 81,000 trees on 5,200 properties in the United States in fiscal year 1965 failed to reveal an infestation. From more than 937,000 trees checked on 25,900 properties in Mexico in the chemical control zone, only 165 infested trees were found on 23 properties. Chemical treatments were applied immediately and no additional blackflies were found.

In the biological control zone 272,949 trees were examined and 10,816 were found infested. Parasites were released as needed to suppress these infestations.

## EUROPEAN CHAFER

A new infestation of the European chafer was located at Cleveland, Ohio, the latter part of June 1965. This continued spread to the West makes the large grain-growing Midwestern States more and more vulnerable to infestation. There has also been local spread beyond the boundaries of the areas of general infestation in New York and Pennsylvania.

The new infestations in Ohio were located by use of blacklight and lure traps. These were developed for the European chafer program a few years ago and have proven to be an effective survey tool. Extensions of the infested area were found in three States totaling 18,987 acres--137 in New Jersey, 9,500 in New York, and 9,350 in Pennsylvania.

The 137 acres found infested in New Jersey have been treated. Pennsylvania has deferred treatment of its infestation until the end of the survey season. Plans have been formulated to treat the entire 2,800 acre infestation in Ohio.

A public hearing was held in December 1964 for purposes of extending the federally regulated area to include the States of New Jersey and Pennsylvania and to exclude West Virginia from the quarantine. It was decided that the quarantine would not be extended to New Jersey and Pennsylvania since those States are conducting control and regulatory programs to prevent spread and ultimately to eliminate the infestations. The Federal quarantine has been rescinded in West Virginia where the European chafer has been eradicated.

## GOLDEN NEMATODE

The only proven infestation of golden nematode in the United States was first discovered in 1941 on Long Island, N.Y. Since then 16,701 infested acres have been found in Nassau and Suffolk Counties. Of this total some 11,000 acres have been permanently removed from agricultural use for residential and other real estate developments leaving approximately 5,700 acres in agricultural production.

This year 499 acres of golden nematode infested land were treated in the continuing effort to eradicate the pest from Long Island. Approximately 2,200 acres of agricultural land remain to be treated.

Surveys are conducted annually within the generally infested area. Other potato land on Long Island is surveyed on a 2-year rotating basis. In addition to the work conducted in New York, surveys are made periodically in other major potato-producing States.



The Plant Pest Control Division assists the New York State Department of Agriculture and Markets in enforcing State quarantine regulations to prevent nematode spread to other fields on Long Island and to other potato-producing areas of the country.

Research on the golden nematode is conducted by Cornell University. In addition to their research to find more effective nematocides, scientists at Cornell have developed a potato variety resistant to the golden nematode. Seed of this resistant variety is now being grown for increase. As commercially acceptable resistant potato varieties become available, they will be recommended to growers for use on treated land and exposed fields.

#### GRASSHOPPER AND MORMON CRICKET CONTROL

Adult surveys conducted in the fall of 1964 revealed that grasshopper populations could be expected to reach economic level throughout several Western States in 1965. The heaviest infestations were found on over 3 million acres in Montana and over 1 million acres each in Idaho and Wyoming. Populations were relatively light in the other Western and Midwestern States. Only minimum damage was observed in most of the rangeland areas.

Undiluted malathion was applied by aircraft to approximately 900,000 acres of rangeland at about one-half pint per acre in 10 Western and Midwestern States. Over 420,000 of these acres were in Idaho, over 160,000 in Montana, and over 220,000 in Wyoming. Kills were generally good.

Aerial chemical spray tests were again conducted in Montana against range grasshoppers in cooperation with Entomology Research Division personnel. Emphasis during the fiscal year 1965 field tests was on extending the ultra low-volume technique to other insecticides. Materials tested included Bidrin, naled (Dibrom), diazinon, carbaryl (Sevin), and an experimental Bayer compound. Naled, diazinon, and carbaryl showed promise of being satisfactory for general use in grasshopper control and were selected for further testing.

Mormon cricket infestations continued at a low level. Less than 200 acres required treatment with ground equipment in Wyoming.

#### GYPSY MOTH

The gypsy moth infestation continued to build up in the Northeast during the summer of 1964. About 264,000 acres of timber were defoliated--an increase of 10,000 acres over the previous year. Damage to trees was particularly severe in eastern Connecticut and eastern New York.

More than 56,000 acres of infested forest land in New Jersey, New York, and Pennsylvania were treated by aircraft during the 1965 season under the cooperative Federal-State program. Of this total 25,000 acres were along the periphery of the generally infested area in New York, 23,000 were in New Jersey, and 8,000 were in Pennsylvania. All known infestations in Pennsylvania were treated. Control measures were not required in Michigan since gypsy moths have not been trapped there since 1961. The carbamate insecticide, carbaryl, was used exclusively on the cooperative Federal-State control programs.

Within the generally infested area about 201,000 acres were treated by State, county, and private organizations in an effort to suppress heavy gypsy moth populations. Of this total nearly 89,000 acres were treated in New York, 54,000 in Connecticut, 23,000 in Massachusetts, and 35,000 in Rhode Island. Treatment was by aircraft except in Rhode Island where 31,000 acres were treated with ground



equipment. Carbaryl was used for the most part; however, DDT was used on approximately 13,000 acres in New York and on 450 acres in Massachusetts at the rate of one-half pound actual per acre.

In addition to chemical aerial spray treatments, various species of gypsy moth parasites and predators were reared and released in saturation numbers along the periphery of the generally infested area in New Jersey, New York, and Pennsylvania. In Jefferson County, N.Y., parasite releases were integrated with minimal applications of a chemical insecticide. During fiscal year 1965, more than 5 million specimens of the egg parasite Ooencyrtus kuwanai were propagated and liberated. Predaceous beetles, Calosoma sycophanta, and larval parasites Sturmia scutellata, Apanteles sp., and Brachymeria intermedia, were also released.

Specially constructed gypsy moth traps were dropped by aircraft over a 47,000-acre area in New Jersey as a supplemental control treatment. The object of the trap drop was to annihilate or drastically reduce the male moth population. More than 56,000 traps baited with gyplure were dispersed over the area in a series of three drops. Male moths lured into the traps were caught in tanglefoot used to line the insides of the trap.

The search for more effective and safer ways of dealing with the gypsy moth was continued. Additional insecticides were field tested at normal and low volume rates. Double aerial applications about 10 days apart were also tested for effectiveness against gypsy moth larvae. Ways to improve the propagation of certain domestic gypsy moth parasites and predators for release in lightly infested areas were investigated. Gyplure, the synthetic sex attractant, was applied in liquid and granular formulation by air to a 26-acre isolated infestation in New Hampshire in an attempt to confuse male moths and thus discourage mating.

Concurrent with the large-scale aerial trap drop, test plots were established in New Jersey and on Cape Cod, Mass., to evaluate the effectiveness of this control technique.

Tests with gypsy moth polyhedral virus were continued in the laboratory and to a limited extent in the field. The addition of sublethal quantities of stress agents including chemical insecticides was tried.

The sterile male release technique was explored further in the laboratory and in the field.



Gypsy moth defoliation--exceptionally heavy 1965.



## IMPORTED FIRE ANT

The imported fire ant infests some 33 million acres in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas. This acreage represents less than 5 percent of its ecological range in this country. Extensive spread of the imported fire ant has been prevented through the treatment of 9 million acres of infested land and the enforcement of a quarantine regulating the movement of commodities capable of spreading the pest.

This year 4,016,840 acres were treated with mirex bait. This is the third year that mirex bait has been the principal insecticide used. The rate of application was reduced from 5 pounds to 2 1/2 pounds per acre. The amount of mirex applied per acre (3.4 grams) remained the same. At this dosage mirex leaves no harmful residue and is not hazardous to other forms of animal life.

The three principal objectives of the fire ant program are: (1) Prevention of long-distance spread, (2) progressive eradication of known infestations, with particular emphasis on infestations in border States and peripheral counties where distribution is not yet general, and (3) cooperation with municipalities and farm groups on area control programs within the generally infested area.

Efforts to improve the imported fire ant control treatments are continuing. Alternate insecticides are being investigated including formulations of bait to prolong its effectiveness in the field. Treatments for regulatory and certification purposes are also investigated. Studies are under way to learn more about trail-finding scents apparently used by the fire ant.

## JAPANESE BEETLE

Approximately 60,000 Japanese beetle traps were in operation in 33 States during the 1965 flight season to locate new infestations and to determine extent of spread from the generally infested area. No new long distance spread was discovered but new infestations were found on the periphery of the generally infested area in several States.

Insecticide treatments for control purposes were applied by ground and air to 23,173 acres in 8 States as follows: Georgia, 1,106; Illinois, 2,300; Kentucky, 738; Michigan, 13,842; Missouri, 3,000; North Carolina, 334; Ohio, 284; and Tennessee, 1,569. Regulatory treatments were applied to 16,125 acres. Of that total, 5,412 acres were soil treated in 17 States, and foliage was treated on 10,713 acres in 5 States.

Aircraft departing from Akron-Canton and Youngstown Airports in Ohio to destinations outside regulated areas were treated with micronized DDT dust as a quarantine measure. The airport soil treatment program has effectively controlled populations and the movement of beetles by aircraft in most cases.

A change in regulations removed 57 counties in Indiana from the regulated area. Surveys failed to reveal infestations in the affected counties. Indiana regulatory officials will enforce intrastate quarantine regulations comparable to the Federal regulations to protect the noninfested counties. Minor changes were made in the regulated areas in Georgia and South Carolina.

Research scientists at the Peoria Utilization Laboratory reported a breakthrough on means of producing milky spore disease in artificial culture. The Bacillus popilliae bacteria were induced to form spores in a liquid fermentation medium by adding activated charcoal. Even though the yield of spores has averaged only about 3 percent, it is a first step toward mass production. Laboratory work is



continuing to search for effective insecticides to replace the chlorinated hydrocarbons. Chemosterilants and low-volume malathion are also being studied as control measures for the Japanese beetle.



BN-20961

Japanese beetle attacking corn silk.

#### KHAPRA BEETLE

For the first time since it was discovered in 1953, it appeared briefly that the United States and Mexico were free of the khapra beetle. But on September 15, 1964, the first of three buildings on the University of Arizona experiment farm was found infested. The other two were found between that time and October 30, 1964. An infestation was found in a feed mill at Yuma, Ariz., on December 15, the second time in less than a year. Four new infestations were found in Tampico, Mexico, in February and March, and an infestation in an empty warehouse at the Houston, Tex., docks was found on February 10, 1965.

No khapra beetles have been found in New Mexico since 1959, and none in California since 1962.

This past year detection surveys for khapra beetle were conducted on 16,301 properties in 30 States in the United States and 10 States in Mexico. Khapra beetles were intercepted 462 times at ports of entry during fiscal year 1965. Intensive surveys are being continued in the United States and Mexico.

During the year 8 properties involving 2,096,038 cubic feet were fumigated. Since 1955, 776 properties involving 208.8 million cubic feet have been fumigated in Arizona, California, New Mexico, Texas, and the Republic of Mexico to eradicate the beetle.



## MEXICAN FRUIT FLY

Each fall and winter Mexican fruit flies migrate from Mexico into southern Texas where they infest citrus in the Rio Grande Valley. During fiscal year 1965, 93 Mexican fruit flies were found infesting fruit from 608 acres on 40 properties in the Valley. At the beginning of each migration season, quarantine procedures are invoked and all fruits move under regulation from infested Texas counties to other citrus-producing areas to prevent spread of the infestation.

A cooperative spray program in Mexico adjacent to the California border, plus strict quarantine measures, has kept western citrus areas free of the pest. Until the program to release sterile males along the Mexican border began on April 23, 1964, the State of California applied protective insecticide treatments by air to maintain a barrier zone along the international boundary from the Pacific Ocean eastward into the mountains. Release of sterile male flies has eliminated the need for chemical treatments along the border.

During the year 4,744,006 sterile male flies were released in the control zone at Tijuana, Tecate, and Ensenada. From April through October 1964, the number of native flies captured in Baja California dropped from 130 to 98 for the same period in 1963.

## PHONY PEACH AND PEACH MOSAIC

The cooperative phony peach and peach mosaic programs have reduced the levels of infection to the point that commercial peach production is now profitable in areas where the diseases are present.

The rate of phony peach infection in host plants has continued to decline during the last several years. During the year 5,650,577 peach trees were inspected with only 6,882, or 0.12 percent of the trees found infected. In 1964, the rate was 0.20 percent. The ability to hold this low level of infection is attributed to: (1) The effective removal of infected trees, (2) the destruction of wild plum, a carrier of the disease, when found in the environs of peach orchards, and (3) the enforcement of uniform State quarantines regulating peach nursery stock.

The peach mosaic rate has declined in fiscal year 1965 to 0.009 percent from a high of 4.16 percent in 1935. During the year 4,579,686 trees were inspected and only 411 trees on 183 properties were found infected. In California, where 17 counties were surveyed, 2 were infected and the vector was found in only 3 of the 15 counties that were negative. The success of this program can be credited to: (1) Delaying inspection until late in the season which assures locating all trees with mosaic, (2) promptly removing infected trees, (3) removing tolerant varieties that serve to mask the infection, and (4) discontinuing infected twig clipping by growers in advance of the inspection crews.

## PINK BOLLWORM

The pink bollworm situation early in the 1964 crop season looked encouraging. Fall surveys showed that a number of counties infested the previous fall were free of the pest. This was especially true in Arkansas and Louisiana.

In Texas, lint cleaner inspection in the Harlingen district showed an increase in pink bollworm infestations. One field had 155 pink bollworms in 3 bales of cotton. In the Houston and Waco areas, the level of infestation remained low.

In Mexico, States other than Baja California and Sonora, pink bollworm infestations ran 10 to 35 percent. There is still no reported infestation in Baja California or Sonora.



Gin trash examination continued to be a good survey tool. In Arizona, over 13,800 acres were found infested in Maricopa, Pima, and Pinal Counties during fiscal year 1965, while only 4,350 acres were found in the same area in 1964. Inspection in Arkansas showed 11,903 acres infested in 2 counties. Pink bollworms were recovered in Caddo, De Soto, and Sabine Parishes in Louisiana during 1965. Eddy County, N.M., was found to be heavily infested. Low populations were found in Dona Ana and Luna Counties.

The recently discovered pink bollworm lure was used experimentally in the Arizona survey during the 1963-64 season. This new survey tool proved so effective that it has virtually replaced light traps in that State. Since this natural lure is produced in such small quantities at the Brownsville Laboratory, the use of such traps in other States must, of necessity, be limited at this time.

#### SOYBEAN CYST NEMATODE

No simple solution to the soybean cyst nematode problem is known at this time but several important steps to control and confine this pest are now being carried out. State and Federal quarantines are in effect to halt the spread and surveys are being conducted to locate new infestations of this pest. Farmers have had to accept crop rotation to grow soybeans profitably in infested areas. Soil surveys indicate 191,555 acres have confirmed infestations in 8 States. Delimiting surveys have not been conducted on all of the land included in the generally infested area. If all land exposed to the soybean cyst nematode had been soil surveyed, the infested acreage might well be over one-half million acres.

When research on the soybean cyst nematode started in 1956, an extensive breeding program seeking an acceptable resistant soybean variety was included. The first resistant variety (NC 55) produced had black seed and was not acceptable to the soybean industry. A new yellow-seeded variety, named Pickett, resistant to the soybean cyst nematode, has now been developed. This variety is similar to the Lee variety and is adapted to growing conditions in most areas where the soybean cyst nematode occurs. Pickett seed was sent to Puerto Rico last winter for increase and this spring available seed has been released to Seed Improvement Associations. It is expected that some seed will be available to growers for commercial planting in 1967.

#### SURVEY AND DETECTION OPERATIONS

The Survey and Detection Operations program involves: (1) Program surveys and (2) the Cooperative Economic Insect Survey.

The Survey and Detection Operations staff participates in planning and coordinating the field activities of surveys conducted under 23 cooperative Federal-State programs. The data are evaluated and maps are prepared to show the status of program pest conditions in the infested areas of the United States. This information serves as a basis for control and regulatory operations.

The Cooperative Economic Insect Survey program is a cooperative Federal-State undertaking to determine and report the abundance and distribution of economic insects. Agricultural agencies and workers in 50 States, the territories, and several foreign countries cooperate in this work. In 1965, over 1,500 reports of insect conditions were received through the State survey coordinators. More than 1,200 agricultural workers contributed to these reports each week during the reporting period.

The Cooperative Economic Insect Report, a nationwide compilation of the reports received from the field observers, is mailed to approximately 3,500 individuals each week in the United States and foreign countries.



Qualified observers, who report on local insect conditions, constitute a nationwide network of people who watch for and report newly introduced foreign insect pests, and the movement to new areas of pests already established in this country. Cooperatively financed survey entomologists are employed in 24 States. No new major plant pests were discovered during the fiscal year.

The extensive trapping program for the Mediterranean fruit fly, continuous since 1962, was again conducted during fiscal year 1965. No flies were trapped in this country or Mexico. The Mediterranean fruit fly has increased both in intensity and in area involved in Central America. Because of modern highways and increased travel, this is a distinct threat to the citrus area of Mexico. If the fly should become established in Mexico, it would be difficult to prevent its entry into the United States. To obtain early evidence of any spread, the United States and Mexico maintain approximately 2,000 traps at the border area of southern Mexico. During the fiscal year this entailed servicing over 34,000 traps in these two countries.

A fruit fly, Anastrepha suspensa, was taken from McPhail traps in the Hialeah area near the International Airport in Miami in Dade County, Fla., on April 27. Continuing surveys have revealed its presence in large numbers in the city. The species has been found in Dade, Broward, and Palm Beach Counties. Although taken from approximately 15 field hosts, it has not been found in citrus. Adults were still being caught in large numbers on June 30, 1965.

A single male specimen of the oriental fruit fly, Dacus dorsalis, was collected last year in a Steiner trap in St. Petersburg, Fla. Trapping has been increased in the vicinity of the original site. No more flies had been found by the end of the fiscal year.



BN-8674

Gin trash machines--our most effective survey tool for pink bollworm.



## SWEETPOTATO WEEVIL

Sweetpotato weevil populations were generally low throughout the infested area. There appears to be some evidence populations are beginning to build up again following the severe freeze in 1962 which, along with an intensive control program, reduced population levels to an alltime low.

More than 13,177 acres were treated by farmers using 2-percent dieldrin dust for field applications in 6 infested States. Florida applied no controls. Under State supervision, 1,344,190 bushels of sweetpotatoes were treated with DDT in storage.

During the 1965 fiscal year 500 properties were found infested, compared to 594 in the previous year. Active infestations were reduced from 2,032 to 1,648. This reduction reflected some of the benefits gained from the extended control effort.

In Alabama weevil populations were low and none were found in any commercial plantings in the important sweetpotato growing sections in Baldwin and Mobile Counties. In Georgia, under a State permit system, the growers treated all seed-beds, field plantings, and storage areas. Only 16 of 2,500 properties inspected were found infested. Since the sweetpotatoes are one of the major cash crops in certain areas of Louisiana, weevil control is essential. A vigorous program by State agricultural agencies involving quarantine enforcement, treatment cleanup, and certification has resulted in a successful operation. Surveys made in 39 parishes revealed no new parishes infested. Infestations were found on 282 properties and 216 previously infested properties were released from regulation.

In Mississippi the situation remained about the same. In South Carolina, where the objective is weevil eradication, no additional infestations were found. An active herbicide program including an insecticide was directed against the wild host plants to kill any weevils present and the results were satisfactory.

In Texas 11 counties were found infested compared to 9 in fiscal year 1964; however, the total number of infestations was reduced from 168 to 119.

Florida, though generally infested, does not produce sweetpotatoes for commercial use. The primary purpose of the program is to reduce heavy infestations that threatened border counties in Alabama and Georgia, and to insure the shipment of weevil-free plants from the interior to points north.

## WHITE-FRINGED BEETLE

During the year 25 new counties in 7 Southeastern States were reported infested for the first time with white-fringed beetle. Throughout the generally infested areas, 33,110 acres were soil-treated to eliminate heavy infestations. Regulatory soil treatments were made to 16,216 acres and foliage sprays to reduce populations were applied to 11,330 acres.

Due to the apparent resistance to chlorinated hydrocarbons by one or more races of the white-fringed beetle, intensified efforts are being made to find more effective ways of dealing with this pest.

During fiscal year 1965, the quarantine was extended to include the States of Arkansas and Virginia.





Severe damage to cornfield by white-fringed beetle larvae, Baldwin County, Ala.

#### WITCHWEED

Since the discovery of witchweed in the United States in 1956, the infestation has been confined to a relatively small contiguous area in 24 North Carolina and 10 South Carolina counties. At the close of the 1965 survey season, 280,072 acres were known to be infested in the two States.

This year treatments were applied to an aggregate of 447,997 acres on 12,064 farms. A herbicide, 2,4-D, was applied at the rate of one-half to one pound per acre. Although the witchweed plant can be controlled in host crops and in crops susceptible to 2,4-D, an effective method is not yet available that will completely eliminate witchweed seed from the soil.

Extensive surveys were conducted in the two known infested States and limited surveys were conducted in 22 principal corn, sorghum, and sugarcane-producing States, as well as other areas in the United States where host crops occur. No new counties have been found infested with this pest since 1963.

Research scientists are continuing their work on stimulants that will germinate witchweed in the soil in the absence of host crops. Others are working on improving fumigation methods for destroying witchweed in the soil and screening new chemicals that show promise of pre-emergence and post-emergence witchweed control.



## SPECIAL SURVEYS

The annual survey for beet leafhoppers began in late January 1965 in the desert breeding areas of southern California. Leafhopper movement to the cultivated areas of southeastern California, central Arizona, southern Nevada, and Utah was light. The average number of leafhoppers per square foot in areas where host plants were present was 0.04, compared with 0.15 in 1964.

This survey was conducted in Texas and New Mexico February 24 through March 9. The general pattern for distribution for the New Mexico area was much the same as in 1964. The infestation was more uniform in the El Paso Valley this year but counts in the area were far below that of 1964.

The 1965 spring survey in Idaho was conducted during March and April. The average number of beet leafhoppers per 100 square feet in 1965 was comparable to 1964. A later nymphal survey failed to show populations high enough to warrant control. Beet growers near Worland, Wyo., treated 5,000 acres with technical malathion.

Boll weevil hibernation surveys, in cooperation with the Entomology Research Division, in the fall of 1964 in Alabama, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and central Texas revealed that the average counts exceeded those of 1964, except in Tennessee. The high survival rate of boll weevil determined by surface trash examinations in the spring of 1965 was revealed to farmers who were alerted to watch for further buildup in their cotton. In Alabama, survival counts ranged from 6 to 162 times the number surviving in 1964; North Carolina and South Carolina ranged from 3 to 10 times greater than in 1964; Mississippi ranged from 2 to 15 times greater than in 1964; central Texas had 52 times as many weevils surviving as in 1964; and Louisiana had 3 times the number surviving as in 1964. The survival in Tennessee was only slightly higher than in 1964.

Potato psyllid survey in the spring breeding areas of Arizona and California was conducted March 15 to 18. Although the average number of psyllids per 100 sweeps was much lower than in the years 1962 and 1963, it was greater than in 1964, and indicated a potentially moderate migration. In the spring breeding areas of Texas and New Mexico, the survey was completed April 7. Generally, the population was much lighter than in 1964 in both Texas and New Mexico, though the El Paso district showed a few more psyllids present than in 1964.

## PESTICIDE SAFETY AND MONITORING

The agricultural pesticide monitoring program initiated in the Mississippi Delta in May 1964 was continued and expanded in fiscal year 1965. Two additional study areas were established in the fall of 1964. One of these is located at Yuma, Ariz., the other at Grand Forks, N. Dak.

Sampling of soil, sediment, water, crops, fish, wildlife, and other environmental media was intensified at all stations during the year. Study of preliminary analytical results showed that the sampling area at each location could be reduced by one-half without significant effect on quality of work. It was also determined that two locations in the Mississippi Delta could be discontinued without detriment to the overall objectives of the program. These modifications of the Delta program allowed for the establishment of a study area at Mobile, Ala., and initiation of special studies on the fate of pesticides in soils at 14 locations throughout the country.

At the close of the year analysis had been run on approximately 3,200 samples and a preliminary report on residues in soils, water, and sediment was being prepared. The efficiency of the analytical laboratory at Gulfport, Miss., was increased through the addition of personnel, equipment, and better housing facilities.



Programs to monitor the effects of cooperative large-scale control programs on the environment were conducted in several areas throughout the United States. A substantial part of this monitoring activity was provided through cooperative participation of State and Federal agencies interested in pesticide use problems. Monitoring reports were distributed during the year on the following control programs: Gypsy moth in New Jersey and Pennsylvania, boll weevil in Texas, grasshopper in Nebraska, and Japanese beetle and cereal leaf beetle in Michigan.

Pesticide accident and incident investigation activities were expanded during the year. Thirty-eight cases were investigated in depth and reports prepared for distribution to cooperating agencies. This work provides background information for the Department and its cooperators in promoting safety in pesticide use.



Residue levels are recorded in parts per million on a gas chromatograph.

#### FOREIGN TECHNICAL ASSISTANCE PROGRAMS

Population levels of the desert locust increased slightly during the year. Small bands were confirmed in Ethiopia and India which were promptly handled by the countries with their individual resources or facilities of regional organizations. Regional Insect Control pilots continued reconnaissance flights to detect new swarms and to locate reported swarms. No swarms requiring assistance in an organized control program were found during the year.

Plant Protection programs in Afghanistan, Sudan, and Turkey were completed by the close of the fiscal year and the technicians returned to the United States for re-assignment. These countries now have plant protection organizations with the



ability to function on their own with a minimum amount of guidance. Much of the success achieved can be attributed to the hard work and leadership provided by the Regional Insect Control Project (RICP) technicians who served in these countries.

During the year a careful review of the RICP revealed that its task had been accomplished. Through a joint decision reached by the Agency for International Development and the Agricultural Research Service, it was mutually agreed to close the Beirut, Lebanon, headquarters office by June 30, 1965, and end the functions of the organization as soon as possible during fiscal year 1966. The Regional Coordinator has been reassigned to Africa to coordinate the final transition of RICP functions to individual countries. Staff members were returned to the United States or reassigned by the close of the year.

The U.S. Department of Agriculture will continue to implement plant protection programs in requesting countries. It now appears that Iran and Ethiopia will have plant protection programs and Sudan will complete its agricultural pilot training program.

#### USE PESTICIDES SAFELY

- Apply only when needed.
- Handle with great care.
- Follow directions on the label and heed all precautions.
- Carefully dispose the unused portion and the container.
- Improper use and disposal may jeopardize human health, domestic animals, desirable plants, honey bees and other pollinating insects, fish and wildlife, and may contaminate water supplies.



*Use Pesticides Safely*  
**FOLLOW THE LABEL**

U.S. DEPARTMENT OF AGRICULTURE



COOPER, J. H.

PLANT, J. H.

1880

PART II

ADDITIONAL, 1881

1881







(\*---\*)

COOPERATIVE PROGRAMS  
PLANT PEST CONTROL DIVISION  
CENTRAL REGION

FISCAL YEAR 1965

**AGRICULTURAL RESEARCH SERVICE**  
United States Department Of Agriculture







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## INTRODUCTION

The thirteen North-Central States, comprising the Central Plant Pest Control Region, conform an area with that of the Central Plant Board. States included are North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana, Ohio, and Kentucky.

Fifteen Plant Pest Control programs were carried on in the Region this past fiscal year, with major emphasis on barberry eradication, cereal leaf beetle, Japanese beetle, soybean cyst nematode, and cooperative economic insect survey. The Cereal Leaf Beetle Methods Improvements Laboratory at Niles, Michigan, was placed under the direct supervision of the Regional Office late in the year. During the fiscal year the DIAP program (Determination of the Impact of Agricultural Pesticides) under the supervision of the Regional Office also became an important part of the work in the Region.

Seven area supervisors were in charge of programs in the Central Region. Six of the supervisors were each in charge of activities in a two-state area, while the seventh operated in one State.

All services performed were accomplished on a cooperative basis with the States involved. Principal cooperators included: State Departments of Agriculture, Labor and/or Conservation, State Extension Services, State Experiment Stations, and the Cooperative Rust Laboratory in St. Paul, Minnesota. Cooperators provided labor, money, space, services, etc., toward the success of the work.

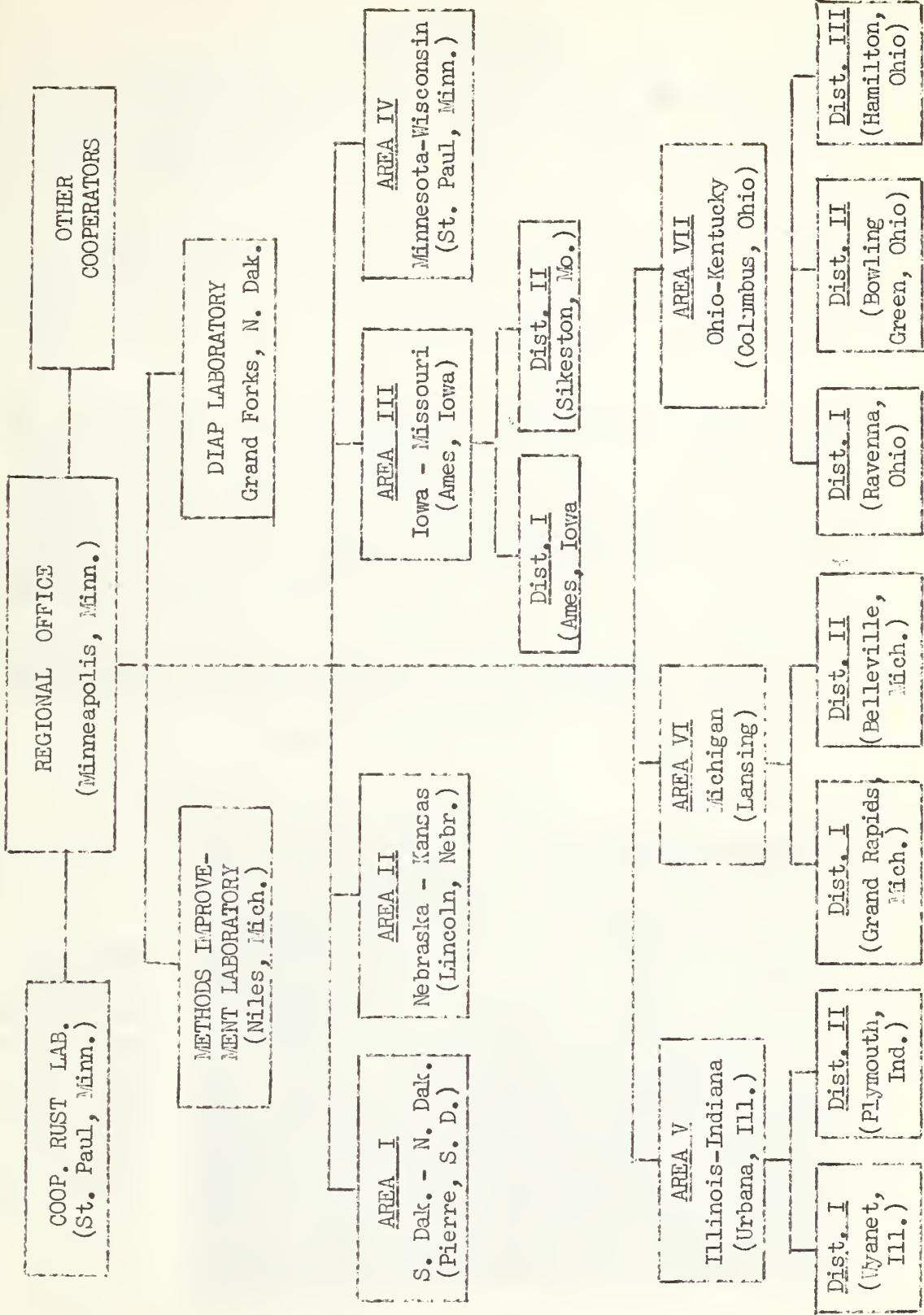
The Crop Quality Council, farm organizations, various civic groups, municipalities, individuals, etc., also gave valuable support to plant pest control programs, in keeping with their respective interests.

The Cooperative Rust Laboratory has furnished the summary for the stem rust- and barberry susceptibility tests parts of the barberry eradication section of this report.

The following report summarizes the activities of the Central Region of the Plant Pest Control Division, Agricultural Research Service, U. S. Department of Agriculture, for the fiscal year July 1, 1964 - June 30, 1965.



# ORGANIZATION





## BARBERRY ERADICATION

During the early years of the barberry eradication program, many destructive local stem-rust epidemics were observed and recorded each year where barberry bushes were the source of infection. As the work progressed throughout the years, the bushes have literally been pushed back into timber and uncultivated areas, so that now rust spreads to grains are almost a rarity in the States of the Central Region. Direct rust spreads in recent years have been observed mostly from barberry to wild grasses. Those familiar with the rust conditions during the early days of the program can fully comprehend what the rust situation would be today if the millions of barberries had not been destroyed.

Generally, the barberries remaining are in areas away from grain fields, thus reducing the possible source of local rust epidemics. However, the studies and records show that the barberry serves an important function in the development of new races that may attack grain varieties resistant to the known races of stem rust. A classic example is the discovery of race 56 of wheat stem rust from collections made in the Middle West in 1928. During the next seven years, this race increased tremendously and spread throughout the Mississippi Valley. In 1935 it was the dominant race and was the principal cause of losses to the bread wheat crop, estimated at 100 million bushels in the United States and Canada. This clearly demonstrates the emphasis that should be placed on the eradication of the remaining barberry bushes existing in areas that are the greatest potential in the hybridizing of races.



This large planted barberry was found on the grounds of Wayne County Historical Society at Wooster, Ohio, early in 1965.



During the past year, evaluation studies were made in all States where active eradication programs are in progress. In some areas only small infestations remain, many of which are scheduled for the final rework. Adjustments were made in work plans in the several States in order to clean up these small areas. It was mutually agreed that this final clean-up work must be accomplished by experienced personnel, which naturally would increase the cost of operation.

Consistent with established policy of personnel utilization, some shifting from the barberry eradication activities to other programs during periods of emergency interrupted normal work plans to some degree. These periodic interruptions, however, are not serious, because the eradication program is a year-around operation in most areas and short delays do not affect the overall program.

Despite the adjustments that were necessary, barberry eradication made good progress during the year. Rework covered 1,479 square miles, and 1,209 square miles in Kansas and Missouri were covered by the initial farmstead method. A total of 12,006 bushes was destroyed on 769 new and previously infested properties. As a result of the surveys this year, 2,232 square miles were placed on maintenance. There remains only a total of 20,052 square miles that will require future inspection.

In compliance with the provisions of Federal domestic quarantine No. 38, 212 nurseries and 38 dealers were approved to ship berberis, mahoberberis, and mahonia interstate.

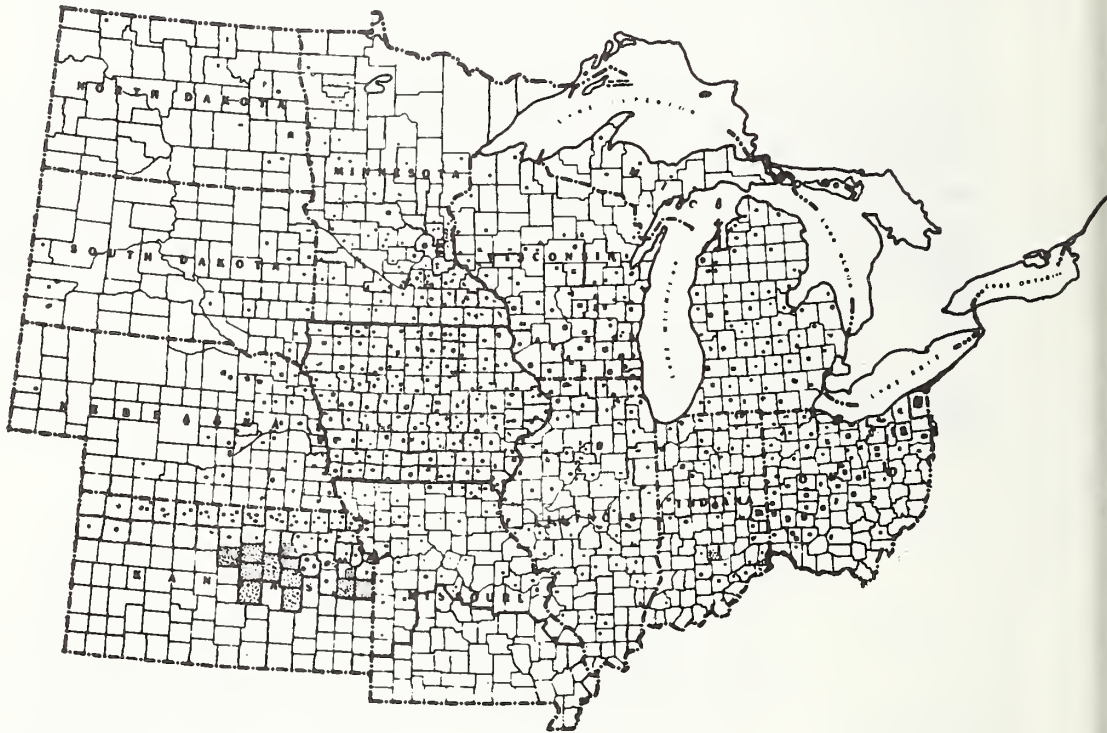
Barberry Eradication - FY 1965




State	Survey and Detection		Control		Regulatory		Other Props.
	Square Miles	Properties	Properties	Plants Destroyed	Nurseries	Inspected	
	Surveyed	Reinspected	with Bushes		Number	Acres	
Illinois	137	400	26	157	29	2,969	4
Indiana	59	94	7	261	14	1,180	0
Iowa	478	442	103	1,703	8	5,764	1
Kansas	1,098	12	12	18	19	1,398	0
Kentucky	-	-	-	-	16	1,319	0
Michigan	240	935	258	2,893	25	1,562	2
Minnesota	124	373	84	2,739	31	2,382	19
Missouri	36	158	6	17	9	1,395	0
Nebraska	42	83	4	13	3	946	0
N. Dakota	-	-	-	-	1	200	2
Ohio	167	344	118	2,254	50	5,242	3
S. Dakota	31	55	7	15	1	250	5
Wisconsin	201	507	114	1,936	6	1,034	2
Totals	2,613	3,403	769	12,006	212	25,641	38



## BARBERRY ERADICATION - CENTRAL REGION

STATUS JULY 1, 1965



	Area requiring intensive work	11,734	square miles
	Area requiring farmstead work	8,318	square miles
	Area on maintenance	656,595	square miles



## PRESENT STATUS, PROGRESS, AND FUTURE REQUIREMENTS, 1918-1965

## Barberry Eradication

State	S q u a r e			M i l e s			P r o p e r t i e s					B a r b e r r y B u s h e s D e s t r o y e d				
	Total in State	Number Initial Work Farm- stead	Covered Inten- sive	Number Requiring Work			No. Re- quiring No Future Work	Total.No. Need- Founding One or to More Rein- forcements	Number Com- pleted	Common	Native	Total to Date				
				One or More Times												
				Farmstead	Intensive	Initial										
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Illinois	56,043	56,043	34,680	4,659	8,177	0	0	0	591	55,452	20,072	2,159	17,913	2,661,642	89,781	2,751,423
Indiana	36,045	36,045	27,333	8,405	3,588	0	299	2	173	35,571	7,016	697	6,319	200,342	212,118	412,460
Iowa	56,167	56,167	44,609	4,904	13,971	0	6	251	3,496	52,414	15,962	4,446	11,516	1,331,812	125	1,331,937
Kansas	32,831	24,818	0	0	0	8,013	0	328	24,490	415	415	415	0	6,434	1	6,435
Michigan	57,481	57,481	26,637	17,096	12,132	0	0	0	1,022	56,459	19,536	4,347	15,189	6,751,429	16	6,751,445
Minnesota	80,883	80,883	32,958	28,742	8,949	0	0	0	1,124	79,759	9,458	2,095	7,363	1,020,238	0	1,020,238
Missouri	37,286	19,735	17,738	789	1,063	0	0	27	133	37,126	1,949	610	1,339	24,706	0	24,706
Nebraska	77,268	77,268	36,832	34,966	7,490	0	0	0	242	77,026	4,958	221	4,737	149,352	0	149,352
N. Dakota	70,183	70,183	1,276	30,105	430	0	0	0	12	70,171	1,084	12	1,072	39,565	0	39,565
Ohio	40,740	40,740	32,197	6,289	13,134	0	0	0	1,571	39,169	17,826	2,145	15,681	3,829,019	0	3,829,019
S. Dakota	76,868	76,868	12,906	4,538	1,577	0	0	0	26	76,842	1,574	46	1,528	136,508	0	136,508
Wisconsin	54,852	54,852	21,314	23,886	12,821	0	0	0	2,736	52,116	18,199	4,325	13,874	5,737,458	0	5,737,458
Totals	676,647	651,083	288,480	164,379	83,332	8,013	305	638	11,625	656,595	118,049	21,518	96,531	21,888,505	302,041	22,190,546



### Stem Rust\*

Losses due to stem rust in 1964 were generally light, estimates being wheat, 5,825,000 bushels; oats, 1,845,000 bushels, and barley, 135,000 bushels. Estimates for leaf rust were: wheat, 11,897,000 bushels, oats, 6,330,000 bushels, and barley, 6,000 bushels. However, local epidemics of wheat stem rust caused appreciable damage in certain areas in the 1964 season. On a state-wide basis, South Dakota sustained an estimated 3 percent loss both in winter- and spring-wheat production, amounting to a loss of about 1,200,000 bushels. This was accounted for, in part, by the fact that roughly half the spring-wheat acreage was sown to either Lee or Rushmore, both susceptible to the prevalent race 15B. Losses in some individual fields of these varieties probably were as high as 20 percent.

The only significant loss caused by stem rust in North Dakota occurred in the southwestern portion of the State, where an estimated 10-percent loss in the Lee and Rushmore acreages provided a statewide spring-wheat loss of about 1 percent, or roughly 900,000 bushels. Loss in the small winter-wheat acreage amounted to only a trace. The durum crop was largely unaffected by stem rust, owing to the widespread cultivation of Wells and Lakota, which had effective resistance to the prevalent races. No race with virulence for Wells and Lakota has been isolated from United States field collections; however, a biotype of race 15 with this virulence has been produced experimentally. (Tests in the greenhouse and in Puerto Rico have shown that many durums and bread wheats have resistance to this isolate.)

Despite the widespread distribution of races virulent on commercial varieties, oats were not measurably affected by stem rust. Little or no damage occurred to barley and rye from stem rust.

Slides exposed at 24 stations from Texas to North Dakota showed larger numbers of stem-rust spores in 1964 than in 1963. Regression equations were calculated for both stem- and leaf-rust spore counts to derive a standard measure of the rates of increase as reflected by spore deposition.

Regression analyses of the spore counts from Lincoln and North Platte, Nebraska, were examined first, using several standard transformations. These locations were chosen for the pilot study because of their high cumulative spore counts. These standard programs were: (1) daily spore count, (2) log cumulative count, (3)  $\log_e$  cumulative count, (4) square root of the cumulative count, (5) square root of the cumulative count plus 1, and (6) square root

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\*This report includes information concerning stem-rust development in some States outside the Central Plant Pest Control Region.



of the cumulative count on the square root of time in days. The common and natural logarithmic transformations gave a relatively good fit to the date. Consequently, counts from the other locations were analyzed, using a common log transformation.

Weather Bureau 1009 cards for the locations and periods involved in the 1964 samples have been obtained for the purpose of developing predictions and probability tables. Preliminary analyses of the 1962 and 1963 spore deposition data are underway.

Special spring-wheat nurseries containing resistant wheats were grown near barberries in Virginia and Pennsylvania to detect virulence in the rust population. No cultures with unusual virulence were obtained. No cultures with virulence for Selkirk, Crim, Justin, or Wells were detected in special rust-trapping plots grown in Mexico, Texas, Oklahoma, Kansas, and Nebraska.

Among 1,266 uredial isolates of wheat stem rust (Puccinia graminis var. tritici), race 56 predominated for the seventh consecutive year and accounted for 40 percent of the isolates identified. Race 15B comprised 36 percent; 32, 11 percent; 38, 10 percent; and 7 other races and subraces, the remaining 3 percent.

Some isolates of race 32 were virulent on the supplemental differential varieties Lee, Selkirk, Bowie, Kenya Farmer, FKN, Crim, and Justin.

About 10 percent of the isolates of race 38 were virulent on Crim and about 5 percent on Justin seedlings. Smaller percentages were virulent on Bowie, Lee, and FKN. Virulence on Selkirk and other supplemental differentials was detected among a few isolates of races 11, 15, and 87.

Race 6F, most prevalent among oat stem-rust (P. graminis var. avenae) races, accounted for 54 percent of isolates identified. Race 6AF, the most virulent race known, increased in prevalence from 10 percent in 1963 to 32 percent in 1964. Also identified were 7A (with 7AF), 7 percent; 2 (with 5), 3 percent; and 2F, 4A, 6A, 7, 8, 12A, and 13A, which accounted for the remaining 4 percent.

Among 8 isolates of wheat stem rust identified from barberry, 7 belonged to the 11-32 race group and one was 15B-2. Five of the 11-32 cultures were virulent on Selkirk seedlings, one was virulent on Bowie and FKN, and another was virulent on Bowie, Kenya Farmer, FKN, Crim, and Justin. Race 2 of oat stem rust was identified from barberry in Virginia and 6F from barberry in Iowa.



### Barberry Susceptibility Tests

During fiscal year 1965, Berberis thunbergi "Kobold," consigned to Monrovia Nursery Company, Azuza, California, and sent by Plant Quarantine Division, Jamaica, New York, was added to the resistant list. Tests were also conducted on plants of B. thunbergi atropurpurea "Golden Ring" and B. sikkimensis. Although the plants tested of these varieties were resistant to P. graminis, they may be heterozygous for resistance, so that progeny tests are required before a final classification can be made. Tests with telia from quackgrass have been conducted on B. pruinosa-longifolia and Mahonia repens var. rotundifolia, to which they were resistant. Further testing with telia from other grass sources is needed before final classification can be made.

### CEREAL LEAF BEETLE

The cereal leaf beetle (Oulema melanopa) has now been found in parts of four States in the Central Region--Illinois, Indiana, Michigan, and Ohio. Intensive surveys in the infested States show that the focus of dense population is still in the southwestern corner of Michigan and just over the line in north-central Indiana. Perimeter surveys have extended the number of counties in which beetle larvae or adults have been found. Since the beetle was first found in this country in 1962, the accumulative total of counties in each State having specimens confirmed as the cereal leaf beetle is as follows:

State	Total No. Counties Infested to Date			
	1962	1963	1964	1965
Illinois	-	-	-	3
Indiana	2	25	32	38
Michigan	2	15	34	42
Ohio	<u>-</u>	<u>1</u>	<u>18</u>	<u>49</u>
Totals	4	41	84	132



Barley is the favored cereal host plant. With the low acreage of this crop planted in the area, the beetles readily fed on oats and in many instances on wheat. Young plants of these cereal crops were damaged severely in areas of heavy populations. Summer adults fed on various wild grasses and quite heavily on the lower leaves of young corn plants in field margins as the cereal crops matured.

Beetles appeared much later this spring than last. Surveys in the four-state area were started on May 17. In other States in the Region all surveys for this pest proved negative.

On July 8 and 9, 1964, a second application of malathion was made to 17,920 acres in Saginaw and Tuscola Counties, Michigan. (The first application to this area was made in fiscal year 1964.) A second application was also made to a four-square-mile area in LaPorte and St. Joseph Counties, Indiana, on July 10, 1964. The work in these two areas completed suppression activities which were started prior to the beginning of this fiscal year.

A Federal-State cooperative aerial program was carried out during the period April 27 to May 14, 1965, in five southwestern Michigan Counties. Technical malathion was applied to 382,772 acres. Some of the primary areas were treated twice.

A similar aerial program was also conducted in four northern Indiana counties during the period May 6 to 12, 1965. Technical malathion was applied to 25,200 and Sevin to 5,760 acres.

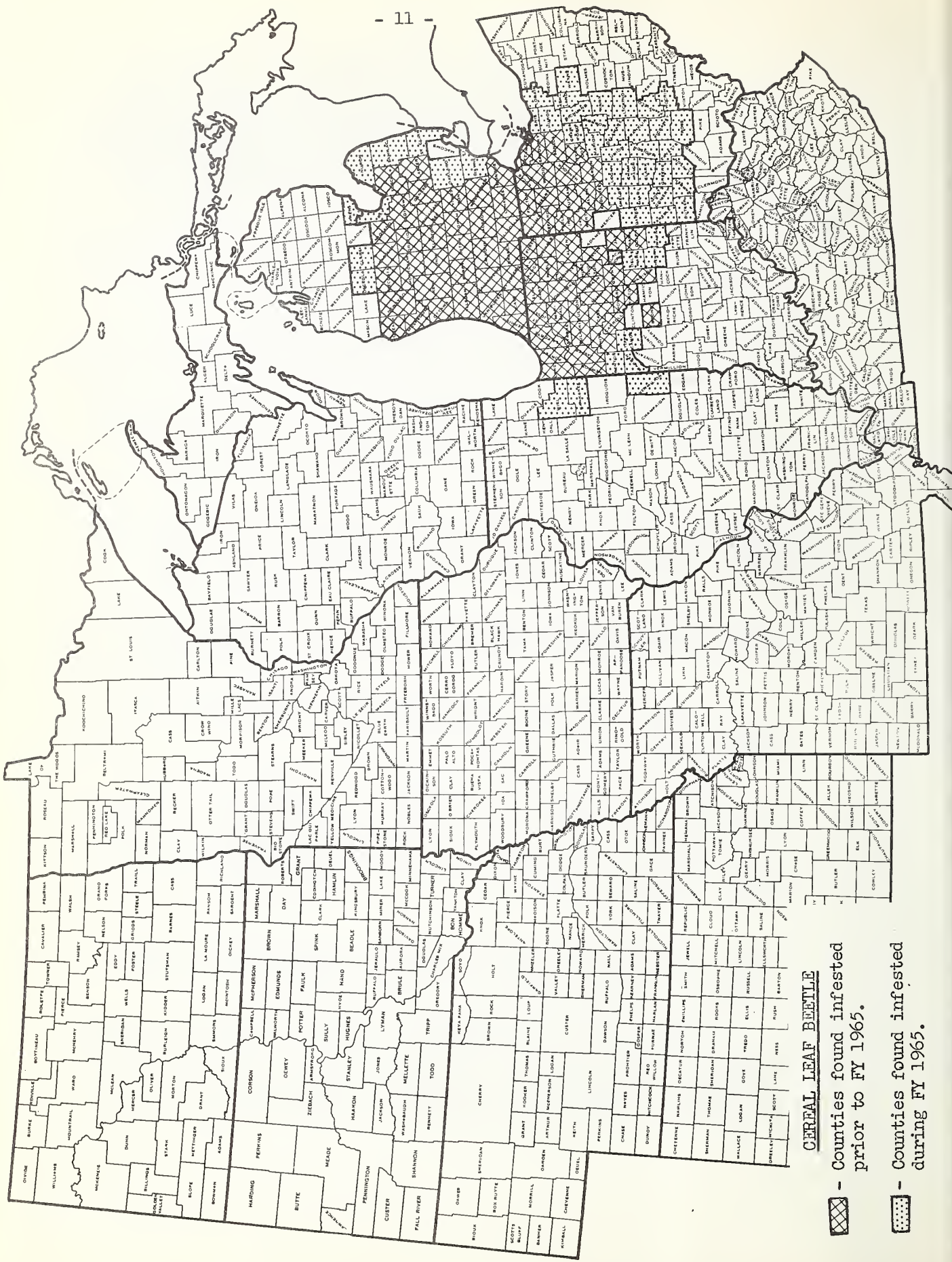
Since the inception of the program in 1963, total acres treated by States include Indiana, 58,394; Michigan, 558,674; and Ohio, 10,720.

With the finding of the cereal leaf beetle in 1965 at seven spots (one beetle and/or larva per spot) in Will, Kankakee, and Vermillion Counties, Illinois, plans were being developed at the close of the fiscal year for the aerial treatment of each spot. Regulatory action will be delayed until surveys are made in the spring of 1966.

State quarantines were in effect in Indiana, Michigan, and Ohio. Infested areas comprising whole counties, and portions of those on the perimeter, were under regulation.

Cereal leaf beetle regulatory activities increased in this three-state area, involving Plant Pest Control and State personnel throughout the year in the counties concerned. Road patrols were maintained to check on the movement of regulated articles or commodities. The supervision of the treatment of grain at terminal





**CEREAL LEAF BEETLE**

- Counties found infested prior to FY 1965.

- Counties found infested during FY 1965.



Fumigation of straw for cereal leaf beetle. Pfeiffer Farm, Upper Sandusky, Ohio. August 1964.



There are about 5,500 bales of straw in the rick at left. Rick measures 38' x 46' x 20'.

In preparation for fumigation, the rick is carefully covered with a tarp.





elevators was of major importance. The fumigation of boxcars and trailers loaded with baled hay or straw was also an important part of regulatory activities. Fumigation stations established in the three-state area numbered 6 in Indiana, 5 in Michigan, and 15 in Ohio.

The cereal leaf beetle Methods Improvement Laboratory at Niles, Michigan, was placed under the direct supervision of the Regional Office in the spring of 1965. Personnel at the laboratory have made checks and studies on many phases of fumigation and related problems. A portable fumigation chamber was constructed for use in studies of cereal leaf beetle mortality when using methyl bromide at low commodity temperatures. An aluminum-neoprene frame for use as a sealer unit for boxcar doors was developed. These frames are used when fumigating good, tight, untarped railroad boxcars. Personnel found that hibernating beetles could be collected in large numbers from wheat stubble brought in from the field. These beetles were used in fumigation experiments. In the spring of 1965, Plant Pest Control personnel at the laboratory assisted research workers in the evaluation of cereal leaf beetle traps and lures.

Cereal Leaf Beetle - FY 1965

State	Survey & Detection		Control		Regulatory	
	Surveyed:			Prop-	Commodity Treatments	
	(No. of	Infested	Acres	erties	Hay, Straw:	Small Grains
	Stops)	Acres	Treated	Inspected:	(Tons)	(Bushels)
Illinois	1,109	5,280	-	-	-	200,000
Indiana	3,262	383,438	33,520	589	2,283	4,000,000
Iowa	265	-	-	-	-	-
Kentucky	179	-	-	-	-	-
Michigan	19,230	2,153,230	382,772	709	21,293	-
Missouri	171	-	-	-	-	-
Ohio	3,274	5,750,400	-	53	42,780	70,975,000
Wisconsin	324	-	-	-	-	-
Totals	27,814	8,292,348	416,292	1,351	66,356	75,175,000



## COOPERATIVE ECONOMIC INSECT SURVEY

The States of Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin have cooperative agreements for the insect survey program. Of these eleven States, five (Indiana, Kansas, Nebraska, Ohio, and South Dakota) had to replace survey entomologists who transferred to other jobs or entered graduate college. This was the greatest single-year change in survey personnel in this Region since the start of the program.

Revised cooperative agreements have been delivered to all eleven cooperating States and are now in the process of being completed.

Survey entomologists cover various sections of their State each week to observe and report on insect conditions. Their reports, together with insect notes from various State, Federal, and individual cooperating personnel are summarized and released through the Survey Coordinator in each State. The summaries are released to interested individuals, commercial firms, pesticide dealers, radio and television stations, etc., and to the Plant Pest Control Division for inclusion in the weekly Cooperative Economic Insect Report.

Plant Pest Control personnel assisted cooperators with the fall chinch bug survey in Illinois, Indiana, and Kansas. No formal surveys were made in other States (Iowa, Missouri, Nebraska) in the chinch bug area, but reports on the situation throughout the season were made by cooperators.

State personnel in all States except Kentucky made the annual fall survey for European corn borer. Survey data was summarized and published in the Cooperative Economic Insect Report by the Division Survey and Detection Operations office.

The maize dwarf mosaic disease of corn was found throughout much of Ohio and in parts of Illinois, Indiana, and Kentucky this past year. Plant Pest Control personnel worked with cooperators in checking fields in many localities for the presence of the disease.

Collections of insects in entomology exhibits at the annual Michigan 4-H Show in East Lansing and the Nebraska State Fair were checked for the presence of insects not known to be present in the localities represented.



The potato psyllid survey in Nebraska was again conducted by cooperators. The survey was made in the extreme west-central part of the State.

Versa-panel displays have been widely used by Plant Pest Control employees in many areas to display survey activities and other program information.

#### EUROPEAN CHAFER

The European chafer was found for the first time in the Central Region at Cleveland, Ohio, on June 28, 1965. Three adult beetles were trapped at a location in the eastern edge of the city. The extent of the infestation is being delimited. Appropriate control action will be taken this fall.

In November of 1964, Ohio Plant Pest Control supervisory personnel attended a one-day workshop at Erie, Pennsylvania, to discuss procedures for trapping; types of traps, their effectiveness and maintenance; selection of trapping sites; and possible rail and automotive routes which might be conducive to spread. During a field trip following the meeting, chafer grubs were found among grass roots in the soil. Ohio personnel received additional survey training in June 1965, when they observed chafer adults in late evening flight in the Erie area.

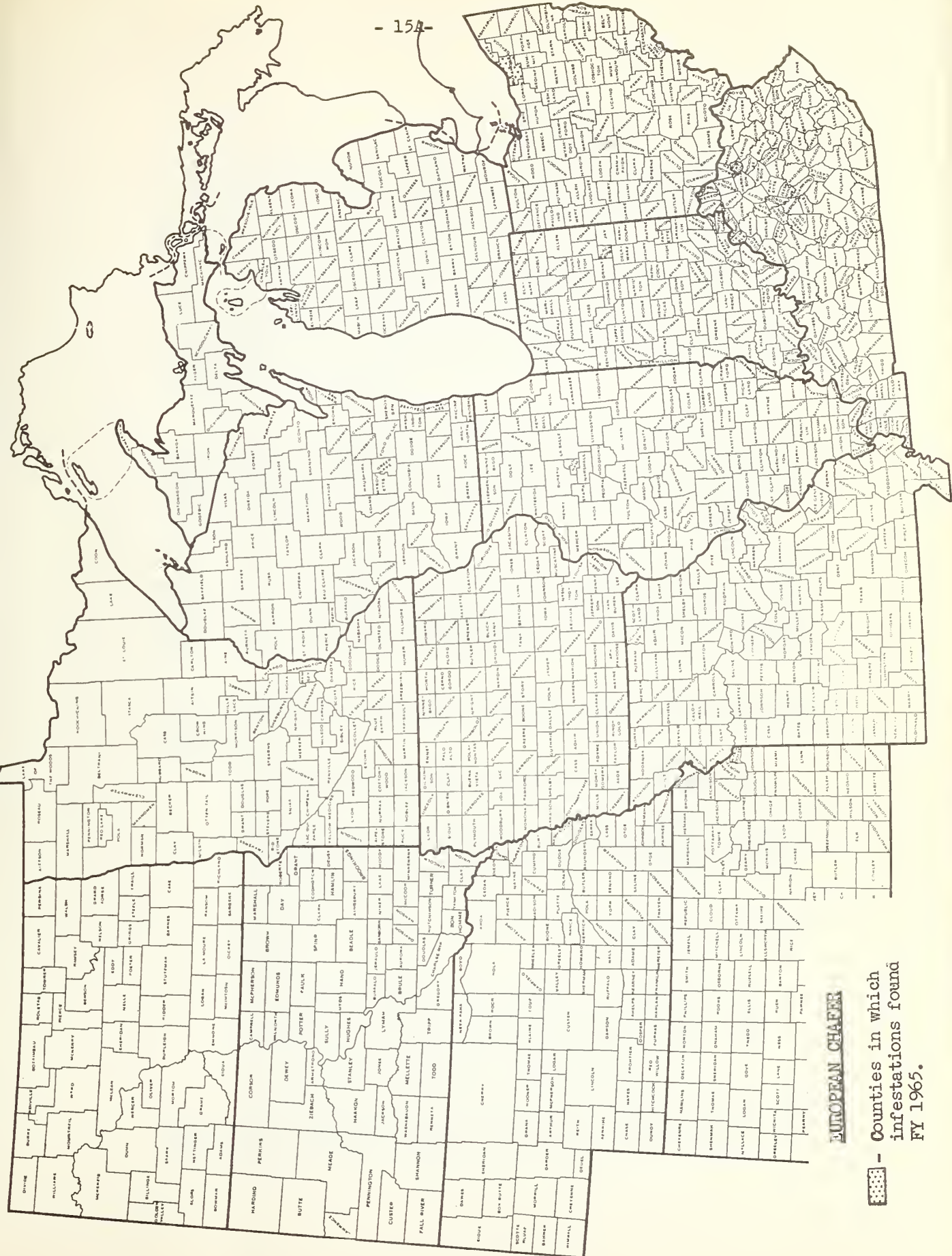
Early in June, 1965, Ohio Federal and State employees set approximately 115 chemical traps and 8 blacklight traps in Ashtabula and Cuyahoga Counties. In the former, trapping was started at the Ohio-Pennsylvania line in the northeast corner of the county. The traps were moved westward every six or seven days.

#### European Chafer - FY 1965

State	Survey & Detection:			Control:		Regulatory		
						Nurseries		
	Sites	In-	Acres	Acres	Acres	Soil-	Props.	
	Trapped	fested	Treated	Inspected	Treated	Treated	Treated	

Ohio	463	1						
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EUROPEAN CHAPTER

Counties in which infestations found FY 1965.







## GRASSHOPPER

Populations of grasshoppers remained at a rather low level in most of the Central Region, except for a few localities. Due to drought conditions during the first half of the fiscal year in part of western and southern Minnesota and Wisconsin, in central South Dakota, and in eastern and southeastern Iowa and parts of Missouri, this pest caused some damage to crops. In all crop areas, farmers did their own grasshopper control with the technical information supplied by the Plant Pest Control Division and State Cooperators. A cold, wet spring throughout the whole Region in 1965 has been a contributing factor in delaying the hatch of grasshoppers and possibly hold their damage to a minimum in most localities this season.

On the Pine Ridge Indian Reservation, Shannon County, South Dakota, 34,320 acres of rangeland were sprayed during the period July 1-7, 1964. Ness Airspray of Lisbon, North Dakota, using two small aircraft, applied malathion to the area at the rate of 8 ounces per acre.

The same contractor also treated 10,960 acres of rangeland in the Pine Ridge area north of Harrison, Sioux County, Nebraska, at the rate of 8 ounces of technical malathion per acre. The Plant Pest Control Division, the State of Nebraska, and ranchers in the area cooperated in this control program.

A summary submitted during the first half of fiscal year 1965, covering the roadside spraying program in North Dakota, showed that:

Forty counties submitted requests for assistance.

Six counties were approved to receive this assistance: Burleigh, Emmons, Golden Valley, Hettinger, Kidder, and McHenry. All of these, except Burleigh, participated in the program.

Spraying was begun on June 8 and completed by June 30, 1964.

Total acres treated was 16,241, at a cost to the Government of \$3,922. The formula of payment was 25 cents, or not to exceed one-third of the total cost, whichever was the lesser amount.

Formal grasshopper surveys, both in crop- and rangeland, were made in infested areas of Illinois, Indiana, Kansas, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, and





Corn in this field was almost stripped of leaves by grasshoppers in the fall of 1964. Gregory, S. D.



Cub P-18 spraying for grasshopper control near Harrison, in Sioux County, Nebraska.

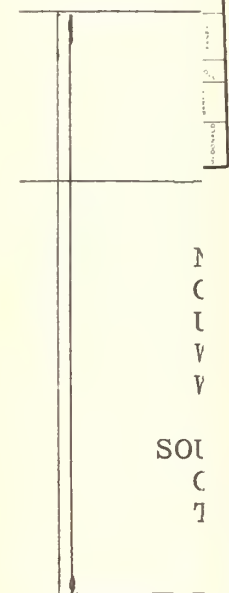


DEPARTMENT OF  
Research  
Control Division

Grasshopper adult  
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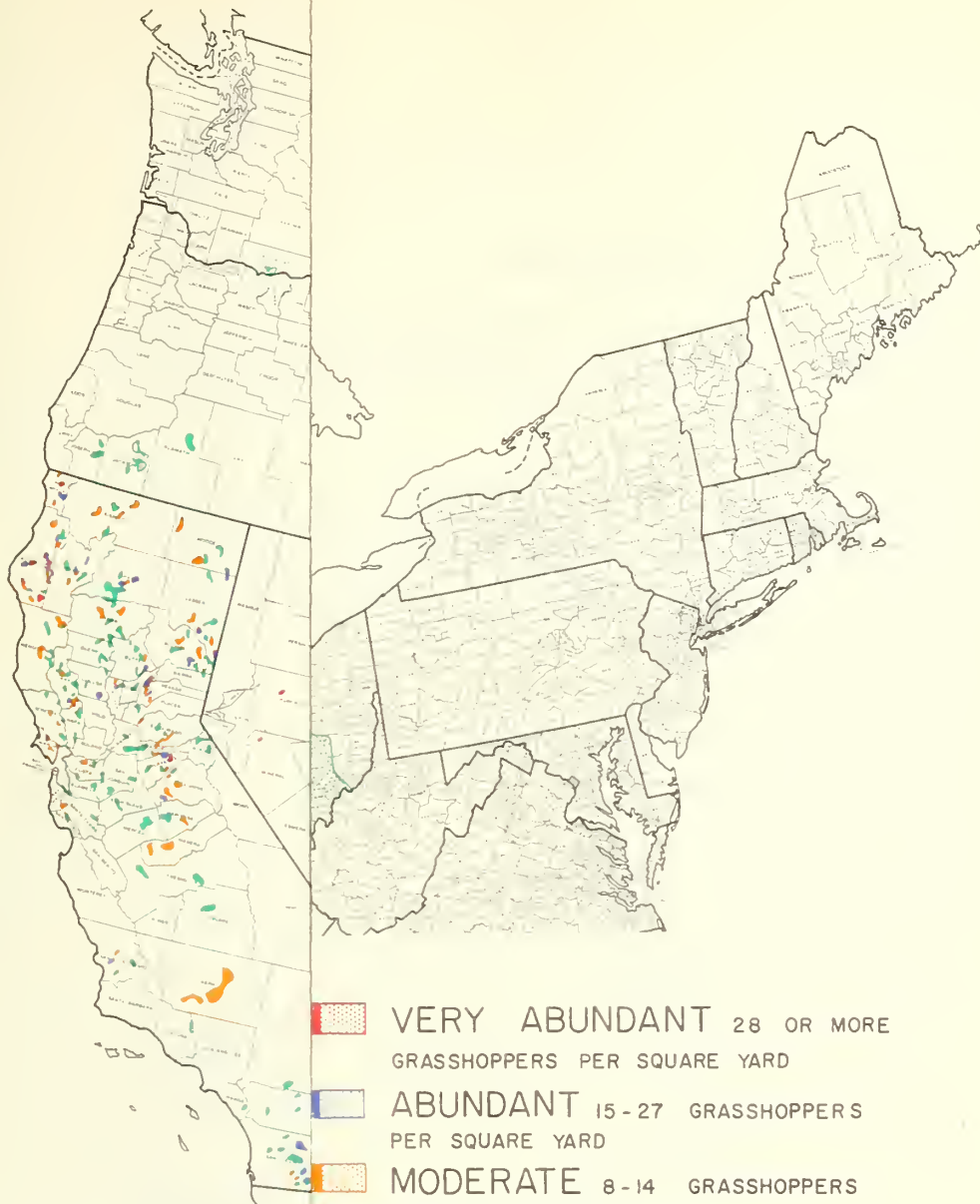
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Division

1965 control season.



- VERY ABUNDANT 28 OR MORE GRASSHOPPERS PER SQUARE YARD
  - ABUNDANT 15-27 GRASSHOPPERS PER SQUARE YARD
  - MODERATE 8-14 GRASSHOPPERS PER SQUARE YARD
  - LIGHT 3-7 GRASSHOPPERS PER SQUARE YARD
- SOLID COLORS - RANGELAND INFESTATIONS  
STIPPLED COLORS - CROPLAND INFESTATIONS

NECESSITY FOR CONTROL ON CROP OR RANGELAND NEXT SEASON  
DEPEND UPON TYPE OF HABITAT, SPECIES PRESENT, WEATHER,  
CONDITION OF VEGETATION.

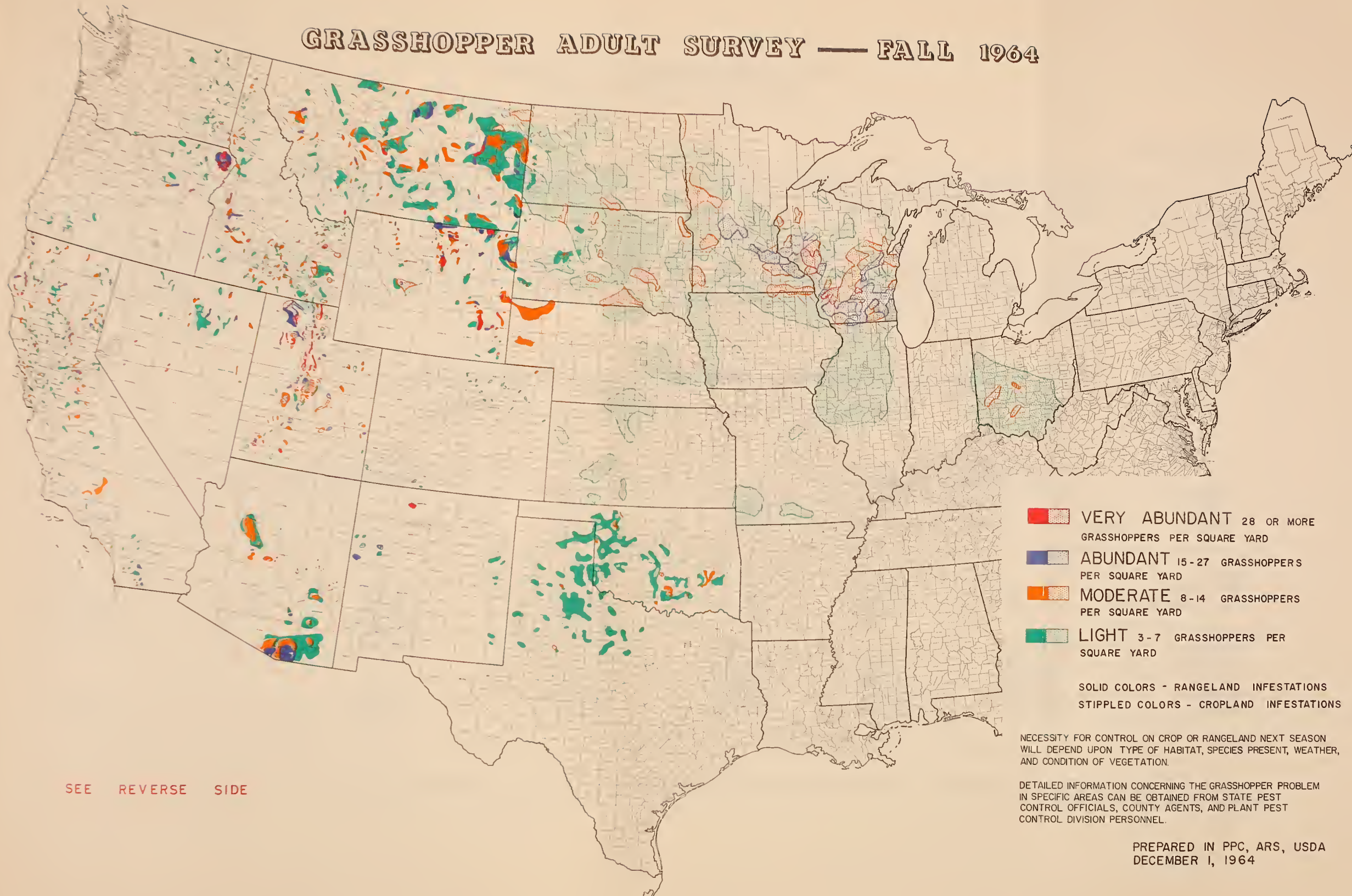
SEE RE

ADDITIONAL INFORMATION CONCERNING THE GRASSHOPPER PROBLEM  
SPECIFIC AREAS CAN BE OBTAINED FROM STATE PEST  
CONTROL OFFICIALS, COUNTY AGENTS, AND PLANT PEST  
CONTROL DIVISION PERSONNEL.

PREPARED IN PPC, ARS, USDA  
DECEMBER 1, 1964



# GRASSHOPPER ADULT SURVEY — FALL 1964



SEE REVERSE SIDE

PREPARED IN PPC, ARS, USDA  
DECEMBER 1, 1964



UNITED STATES DEPARTMENT OF AGRICULTURE  
Agricultural Research Service  
Plant Pest Control Division

TO COOPERATORS:

This map is based upon the results of cooperative grasshopper adult surveys made during the late summer and fall of 1964. The survey reveals where and how many grasshoppers infest an area, and indicates the potential severity of infestations for 1965. Nymphal surveys, made in the spring, determine population densities, and indicate those areas where control may be necessary in 1965.

The infestations in croplands, shown on the map in stippling, appear to have decreased in some of the North Central States below the level which was indicated in the 1963 fall survey. Control on those lands will be handled by the farmers with technical assistance from Division and State personnel. The infested range areas, shown on the map in solid colors (orange, blue and red only), total 8,711,400 acres in 14 Western and Midwestern States. Shaded areas on the map are diagrammatic. Within these areas, infestations may be solid or spotted.

RANGELAND GRASSHOPPER INFESTATIONS - ACREAGE BY REGIONS, FALL 1964

(Moderate Populations or Above - Orange, Blue and Red)

REGION AND STATE	LANDOWNERSHIP - ACRES		TOTAL ACRES		REGION AND STATE	LANDOWNERSHIP - ACRES		TOTAL ACRES
	Private and State	Public Domain				Private and State	Public Domain	
CENTRAL								
Nebraska	45,000	30,000	75,000		New Mexico	5,000	--	5,000
So. Dakota	37,660	1,040	38,700		Oregon	185,000	20,000	205,000
					Utah	234,700	471,400	706,100
WESTERN					Washington	17,000	--	17,000
Arizona	1,025,900	442,000	1,467,900		Wyoming	989,500	166,500	1,156,000
California	371,400	1,800	373,200					
Idaho	269,300	911,500	1,180,800		SOUTHERN			
Montana	2,251,500	942,500	3,194,000		Oklahoma	115,300	--	115,300
Nevada	68,750	103,650	172,400		Texas	5,000	--	5,000

The survey was planned and performed by the Plant Pest Control Division, Agricultural Research Service, in cooperation with various State agencies concerned.



F AGRICULTURE  
Service  
ivision

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indicates the potential severity of infestations for 1965.  
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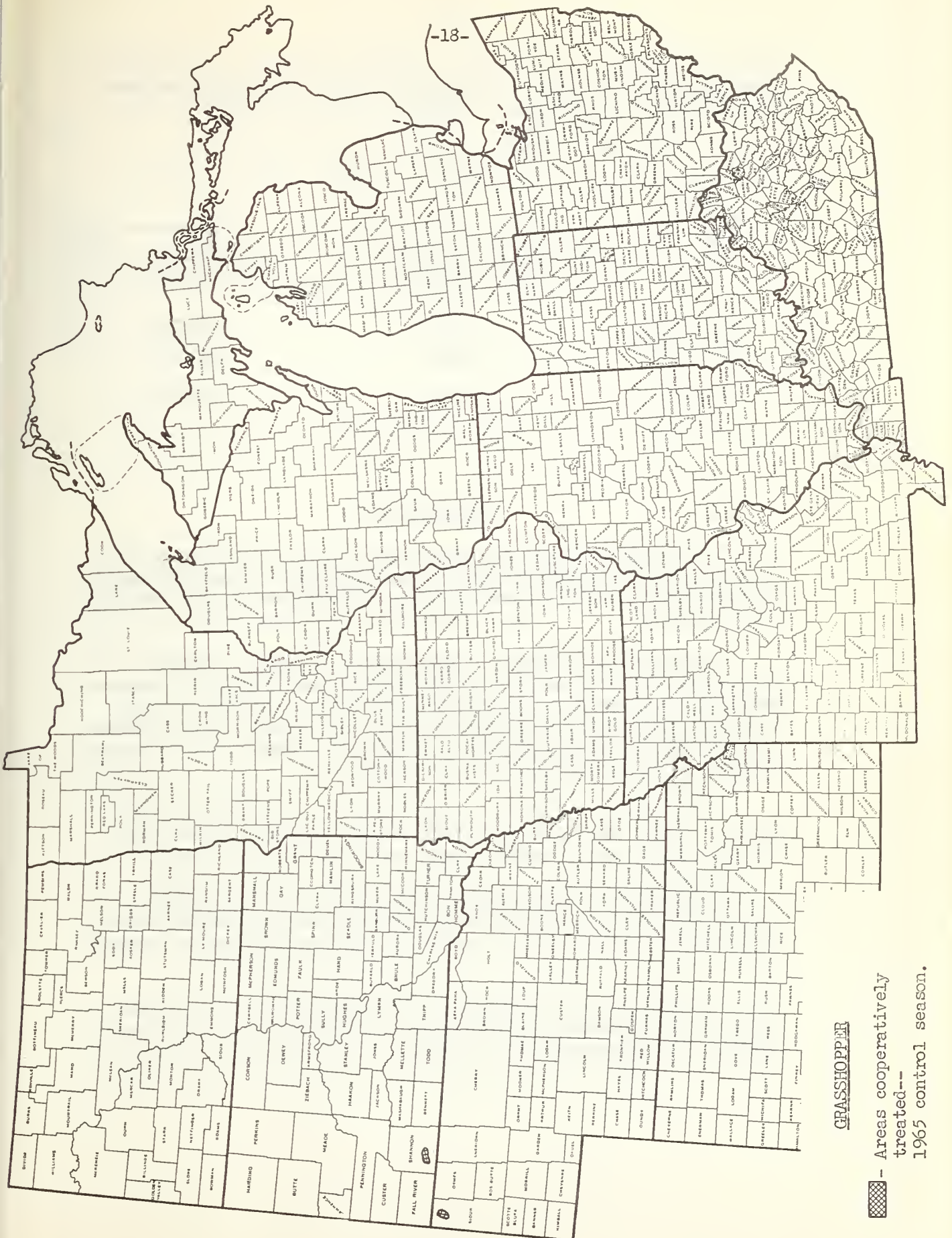
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ed areas on the map are diagrammatic. Within these areas,

EAGE BY REGIONS, FALL 1964  
  
(orange, Blue and Red)

REGION AND STATE	LANDOWNERSHIP - ACRES		TOTAL ACRES
	Private and State	Public Domain	
New Mexico	5,000	--	5,000
Oregon	185,000	20,000	205,000
Utah	234,700	471,400	706,100
Washington	17,000	--	17,000
Wyoming	989,500	166,500	1,156,000
SOUTHERN			
Oklahoma	115,300	--	115,300
Texas	5,000	--	5,000

Agricultural Research Service, in cooperation with various





# GRASSHOPPER

- Areas cooperatively treated--  
1965 control season.





Wisconsin by Plant Pest Control and State personnel. Personnel in Iowa, Michigan, and Missouri reported survey information as observations were made during the season.

Grasshopper - FY 1965

State	Survey & Detection	Control
	Acres Infested	Acres Treated
Nebraska	75,000	10,960
South Dakota	<u>38,700</u>	<u>34,320</u>
Totals	113,700	45,280

GYPSY MOTH

Gypsy-moth traps this fiscal year were set in seven States in the eastern half of the Region, as follows: Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. All trapping was negative.

Michigan intensively trapped areas in Ionia, Clinton, and Shiawassee Counties as part of their continued program to eradicate the gypsy moth in that State. No moths have been trapped nor have egg clusters been found since late summer 1961. Should trapping be negative this year, it will be assumed that the gypsy moth has been eradicated in these counties.

In the other States, the trapping was a detection-type survey. Traps were placed at public camp grounds, highway rest areas, State parks, a harbor area, and other similar locations.

Plant Pest Control inspectors in many of the States in the Region were called upon to inspect camping and automotive equipment of people who had camped in gypsy-moth-infested areas in New England in 1964. All inspections were negative.

Several wholesale dealers of Christmas trees in Kentucky and Ohio were checked by Plant Pest Control inspectors for compliance with gypsy-moth regulations. No violations were found.



Gypsy Moth - FY 1965

		:Survey & Detection:			Control		:	Regulatory		
		: Sites		: Acres Treated		: Acres		: Properties		:
State	:	:	:	:	: Satur-	:	: Inspected	:	Inspected	: Acres
	:	: Posi-	: Chemi-	: ation	: Nur-	:	: Indus-	:	Foliage	
	:	: Trapped	: tive	: cal	: Trapping	: sery	: Other	: try	: Other	: Treated
Iowa	45	-	-	-	-	-	-	-	-	-
Kentucky	25	-	-	-	-	-	5	35	-	-
Michigan	2,963	-	-	-	-	-	-	-	-	-
Missouri	47	-	-	-	-	-	-	2	-	-
Nebraska	-	-	-	-	-	-	-	2	-	-
Ohio	378	-	-	-	-	-	10	85	-	-
Wisconsin	200	-	-	-	-	-	-	-	-	-
Totals	3,658	-	-	-	-	-	15	124	-	-

JAPANESE BEETLE

Japanese beetles continue to be a problem in many localities throughout States in the eastern portion of the Central Region. Control programs in isolated areas of infestation have been a factor in preventing their spread westward.

Trapping programs to detect the presence of beetles were carried on in all States in the Region.

In April 1965, 58 counties in southern Indiana were released from Federal regulation. The greatest concentrations of traps were in Illinois, Kentucky, Michigan, Missouri (St. Louis area), and Ohio. Beetles were found in traps at various locations in these States. All other trapping was negative.

Two methods of control or suppression of the beetles were used. Granular dieldrin was applied to soil both by helicopter and ground equipment to control the grub stage. Mist blowing of foliage in certain areas with DDT and Sevin was used to kill adult beetles.

Granular dieldrin was applied to approximately 2,300 acres in Battle Creek, Michigan, with a helicopter. In the same general area nearly 10,000 acres were treated by means of ground equipment. Soil treatment by ground equipment was also accomplished in areas of various sizes in Louisville and Lexington, Kentucky; St. Louis, Missouri; Wayne County, Michigan; East St. Louis and Cook County,



Illinois; and in scattered isolated locations in Ohio. In the latter State, approximately 67 acres were treated at the National Aeronautics and Space Administration and the Cleveland-Hopkins Airport, both within the same general boundaries.

Roadside vegetation along U. S. 24 west of Kentland, Indiana, and a portion of Indiana State Route 71 in the same area were mistblown with DDT. Adult populations of beetles were rated heavy in this rural agricultural area.

Peripheral areas of the Akron-Canton and Youngstown airports in Ohio were treated with mistblown Sevin during the period July 10-August 26. Because of beetle populations, these airports had been declared hazardous during this period. All planes originating or stopping at these airports and departing for unregulated destinations were treated.

Additional activities within regulated areas included the visual inspection of nurseries and greenhouses, supervision of treatment of turf farms, inspection of fields of sweet corn and other related regulatory activities.

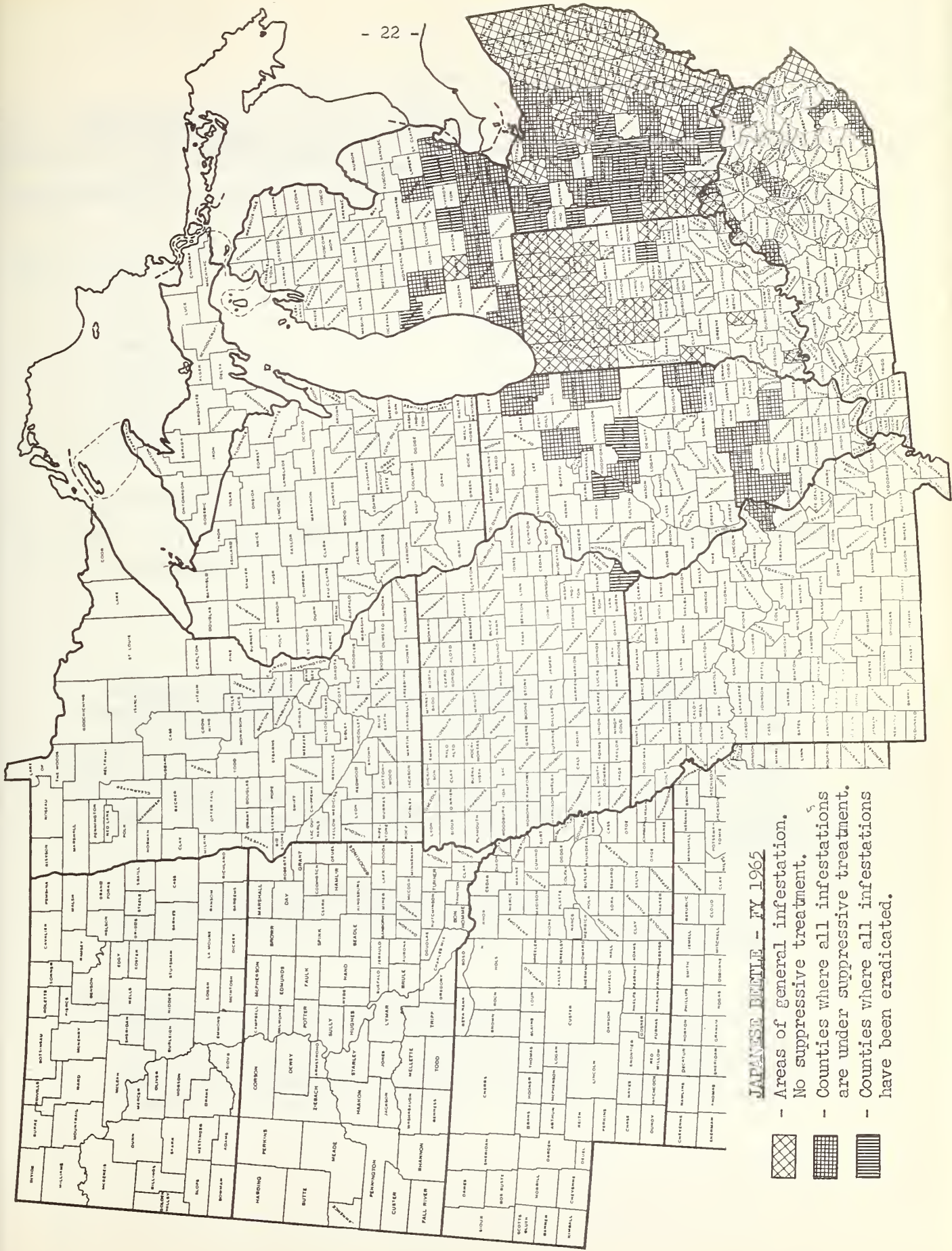
In May the State of Illinois placed an order for 800 pounds of milky spore disease granules. Tentative plans are that this material will be used next fall to treat test plots of agricultural land which are now infested with Japanese beetles.

Three colonies of Tiphia vernalis were released at the Japanese-beetle-infested Ottawa Park Golf Course, Toledo, Ohio, on May 14. The following day three additional colonies were released in an agricultural area at Sheldon, Illinois. This wasp is a parasite of the beetle and studies will be made of its survival, and possible effect on the beetle.

Personnel of the Fairfax Laboratory, Fairfax Corners, New York, collected 4,000 Japanese beetle grubs at the Boston Hills Country Club in Summit County, Ohio, for their use in research studies. Ohio Plant Pest Control personnel located the grubs for laboratory personnel.

Japanese beetle grubs for use in milky-spore-disease research were again collected in Ohio for the Northern Utilization and Research Development Laboratory, Peoria, Illinois. Three lots of the grubs, totaling 68,500, were collected by Plant Pest Control personnel and delivered to the laboratory.





**JAPANESE BEETLE - FY 1965**

- Areas of general infestation.
- No suppressive treatment.
- Counties where all infestations are under suppressive treatment.
- Counties where all infestations have been eradicated.





Japanese Beetle - FY 1965

State	Survey & Detection:			Control		Regulatory					
				Chemical	Biological	Acres Insp.	Props. Insp.	Acres Tr.			
	Sites	Acres		Parasites	Nur-	In-			Foli-		
	Trapped	Infested	Acres	Released	sery	Other:	dus-	Other:	Soil:	age	
Illinois	5,903	72,275	2,300	-	-	-	-	-	-	-	-
Indiana	217	-	-	300	8,349	1,156	650	486	180	114	-
Iowa	740	-	-	-	-	-	-	-	-	-	-
Kansas	243	-	-	-	-	-	-	-	-	-	-
Kentucky	3,792	1,204	738	-	-	-	-	-	-	-	-
Michigan	22,669	92,514	13,842	-	-	-	-	-	-	-	-
Minnesota	1,049	-	-	-	-	-	-	-	-	-	-
Missouri	6,085	300	3,000	-	-	-	-	-	-	-	-
Nebraska	60	-	-	-	-	-	-	-	-	-	-
N. Dakota	67	-	-	-	-	-	-	-	-	-	-
Ohio	4,005	325	284	300	-	-	590	312	868	4600	-
S. Dakota	70	-	-	-	-	-	-	-	-	-	-
Wisconsin	727	-	-	-	-	-	-	-	-	-	-
Totals	45,627	166,618	20,164	600	8,349	1,156	1,240	798	1,048	4714	-

KHAPRA BEETLE

A large number of commodity shipments from khapra-beetle-infested ships docking at United States ports were made to various destinations within the Region this year. The commodities were transported both by railroad and motor freight. Plant Pest Control inspectors or State cooperators inspected railroad cars, motor trailers, and commodities at destination and, when required, fumigated with methyl bromide or treated them, and sometimes the environs, with malathion.

Plant Pest Control Division assisted with the inspection of ASCA storage bins at Vernon, Michigan. A heavy dermestid infestation was determined by U. S. National Museum taxonomists to be Trogoderma glabrum.

During the year, Plant Pest Control inspectors checked numerous establishments such as feed mills, grain elevators, bag companies, seed firms, dry milk storage places, etc., for the presence of khapra beetle. All such inspections were negative. In Michigan Plant Pest Control Division personnel and personnel of the Plant Quarantine Division together inspected 34 properties in Detroit.



Khapra Beetle - FY 1965

State	Survey & Detect.:			Control :		Regulatory		
	Properties			Fumi-		Properties :		
	Sur- : Posi-			gated :		In- : Lots :		
	veyed	tive	(Cu. Ft.)	spected	Treated	Treated	Transports	Treated
Illinois	23	-	-	-	-	-	-	-
Indiana	7	-	-	-	-	-	-	-
Iowa	26	-	-	2	-	-	-	-
Kansas	-	-	-	-	61	-	1	-
Kentucky	16	-	-	-	-	-	1	-
Michigan	35	-	-	-	-	-	-	-
Minnesota	17	-	-	1	-	-	-	-
Missouri	25	-	-	1	-	-	-	-
Nebraska	1	-	-	1	6	-	6	-
Ohio	<u>42</u>	<u>-</u>	<u>-</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>1</u>	<u>-</u>
Totals	192	-	-	6	67	-	9	-

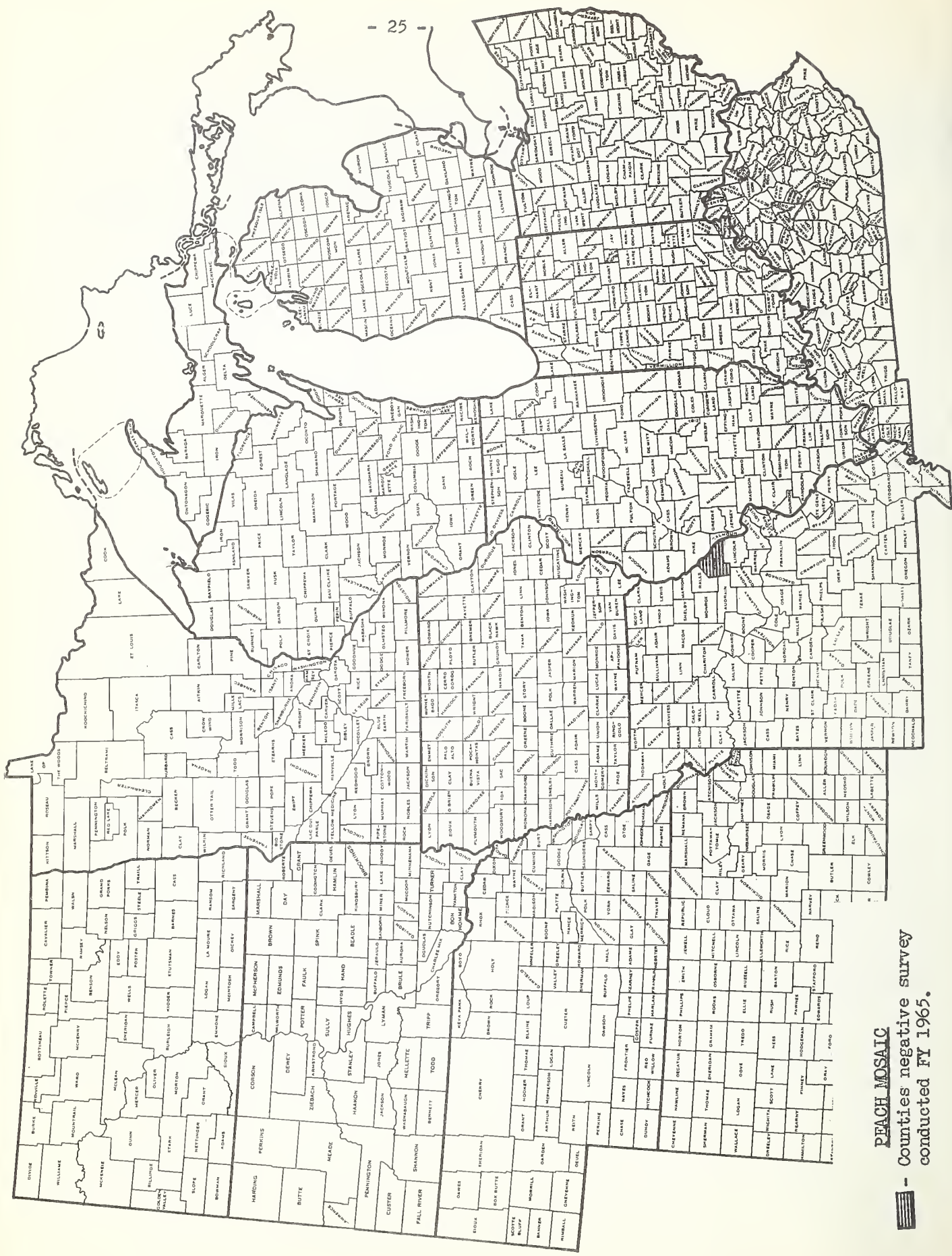
PEACH MOSAIC

Peach mosaic is not known to be present to date in orchards in this Region. Inspections of 473,000 trees in Stark Brothers Nursery, Louisiana, Missouri, proved to be negative.

Peach Mosaic - FY 1965

State	Survey and Detection				Control:		Regulatory	
	Properties				Hosts		Acres Inspected	
	:				:		:	
	Surveyed:	Infected:	Surveyed:	Infected:	Trees Removed:	Nur-	En-	virus
Missouri	<u>7</u>	<u>-</u>	<u>473,000</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Totals	7	-	473,000	-	-	-	-	-





**PEACH MOSAIC**  
- Counties negative survey  
conducted FY 1965.



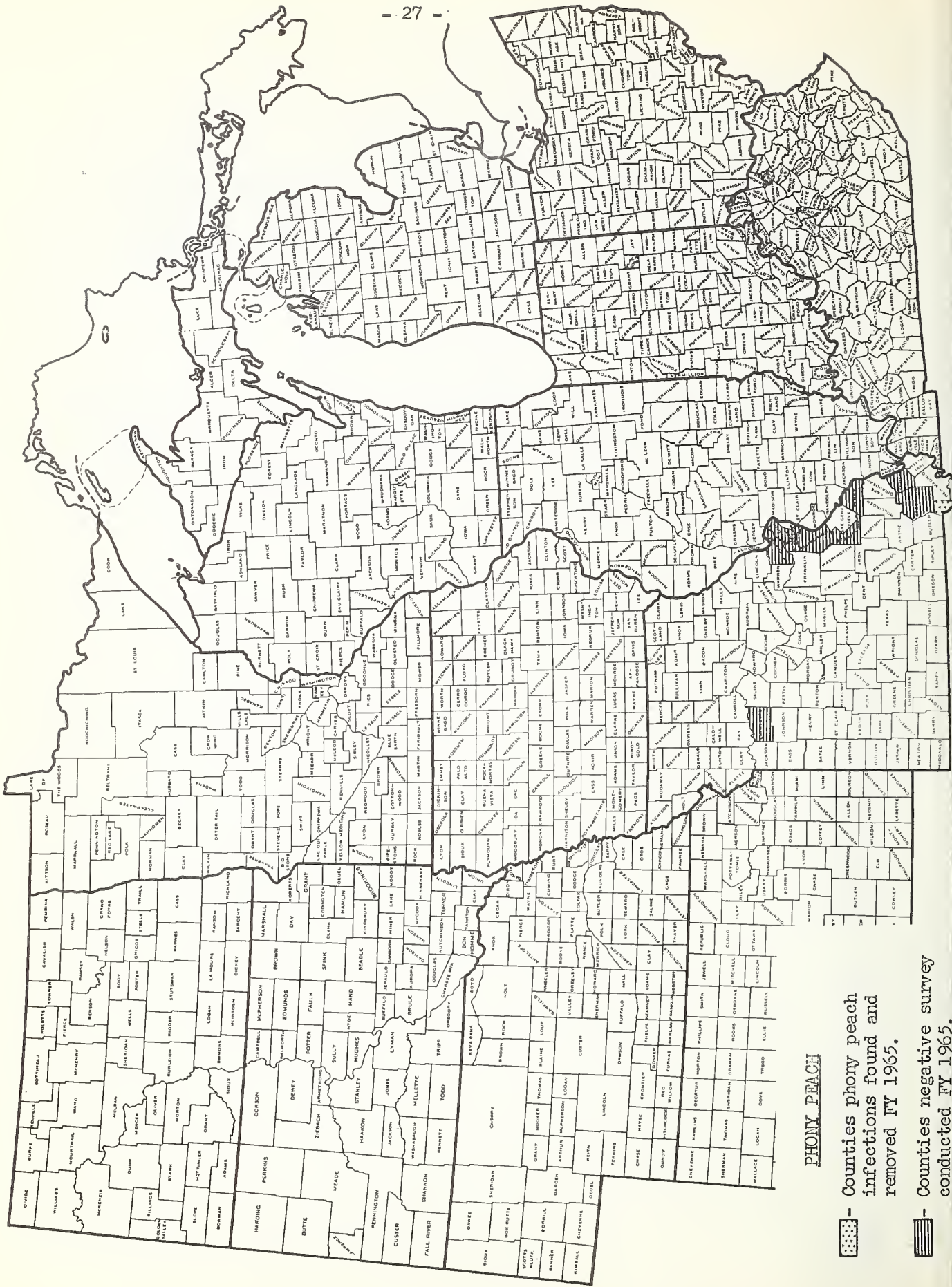
# PHONY PEACH

Peach orchards in Dunklin, Jefferson, Lafayette, Perry, St. Charles, St. Francis, St. Louis, Scott, and Stoddard Counties, Missouri, were inspected for this disease. A total of 61,245 trees were checked and only four, on two properties in Dunklin County, were found infected. These were removed and destroyed by the property owners.

## Phony Peach - FY 1965

	: Survey and Detection				: Control		: Regulatory
	: Properties		: Hosts		: Trees:Acres		: Nursery
	: : In-		: : In-		: Re-	: Herbi-	: In-
	: Surveyed	: fected	: Surveyed	: fected	: moved	: cided	: spected
Missouri	<u>56</u>	<u>2</u>	<u>61,245</u>	<u>4</u>	<u>4</u>	<u>-</u>	<u>-</u>
Totals	56	2	61,245	4	4	-	-





**PHONY PEACH**

Counties phony peach infections found and removed FY 1965.

Counties negative survey conducted FY 1965.



# PINK BOLLWORM

The pink bollworm has not been found in the limited cotton-growing areas of this Region--western Kentucky and southeastern Missouri.

Cotton gins in Fulton County, Kentucky, were inspected with negative results. During September and October over two thousand bushels of gin trash were inspected from gins located in the six southeastern counties in Missouri. This work was carried on in cooperation with the Missouri State Department of Agriculture.

During the year, supervisors spot-checked numerous shipments of cotton products consigned to various points throughout all States. This checking was done to make sure that the items were used at destination and not reconsigned or diverted to points within the Southern Region.

## Pink Bollworm - FY 1965

State	Survey and Detection		Control		Regulatory	
	Surveyed	Infested			Properties	Inspected
	Prop- erties	Prop- erties	Acres	Mechani- cal Acres	In- dustrial	Other
Illinois	-	-	-	-	27	-
Indiana	-	-	-	-	2	-
Kentucky	2	-	-	-	2	-
Minnesota	-	-	-	-	22	-
Missouri	29	-	-	-	3	-
Ohio	-	-	-	-	3	-
Wisconsin	-	-	-	-	7	-
Totals	31	-	-	-	66	2

Missouri: 3,184 "bushels" gin trash inspected.



## SOYBEAN CYST NEMATODE

The past year has seen a slight increase in the number of counties infested with the soybean cyst nematode. Three new counties were added to the infested area in southern Illinois, one in western Kentucky, and two in southeastern Missouri. This nematode has now been found in five counties in Illinois, five in Kentucky, and ~~ten~~ in Missouri.

Three methods of survey were used in soybean-producing areas of this Region: aerial, symptom, and soil sampling.

In August an aerial survey for infested fields was conducted in the extreme southern part of Indiana along the Ohio and Wabash Rivers. The Indiana Department of Conservation plane was used to check fields in river-bottom land in Posey, Vanderburgh, and Warrick Counties. Plant Pest Control and Indiana Department of Conservation personnel participated in this survey. Elsewhere symptom surveys were made in various localities by automobile, and in suspect fields plants were pulled and roots examined. Soil sampling has generally been the method of survey used in the Region, but it now is being gradually replaced by the symptom survey plus root examination.

Washing stations for processing soil samples were in operation at Shakopee, Minnesota; Ankeny, Iowa; Carbondale, Illinois; Hickman, Kentucky; and Sikeston and Hayti, Missouri.

It is estimated that damage to soybean crops in the infested areas this year was as follows:

State	Number of			Value in Dollars
	Counties	Acres	Bushels	
Illinois	5	2,045	4,135	\$ 10,350
Kentucky	1	3,500	76,000	188,000
Missouri	<u>8</u>	<u>127,730</u>	<u>377,640</u>	<u>981,864</u>
Totals	14	133,275	457,775	\$1,180,214



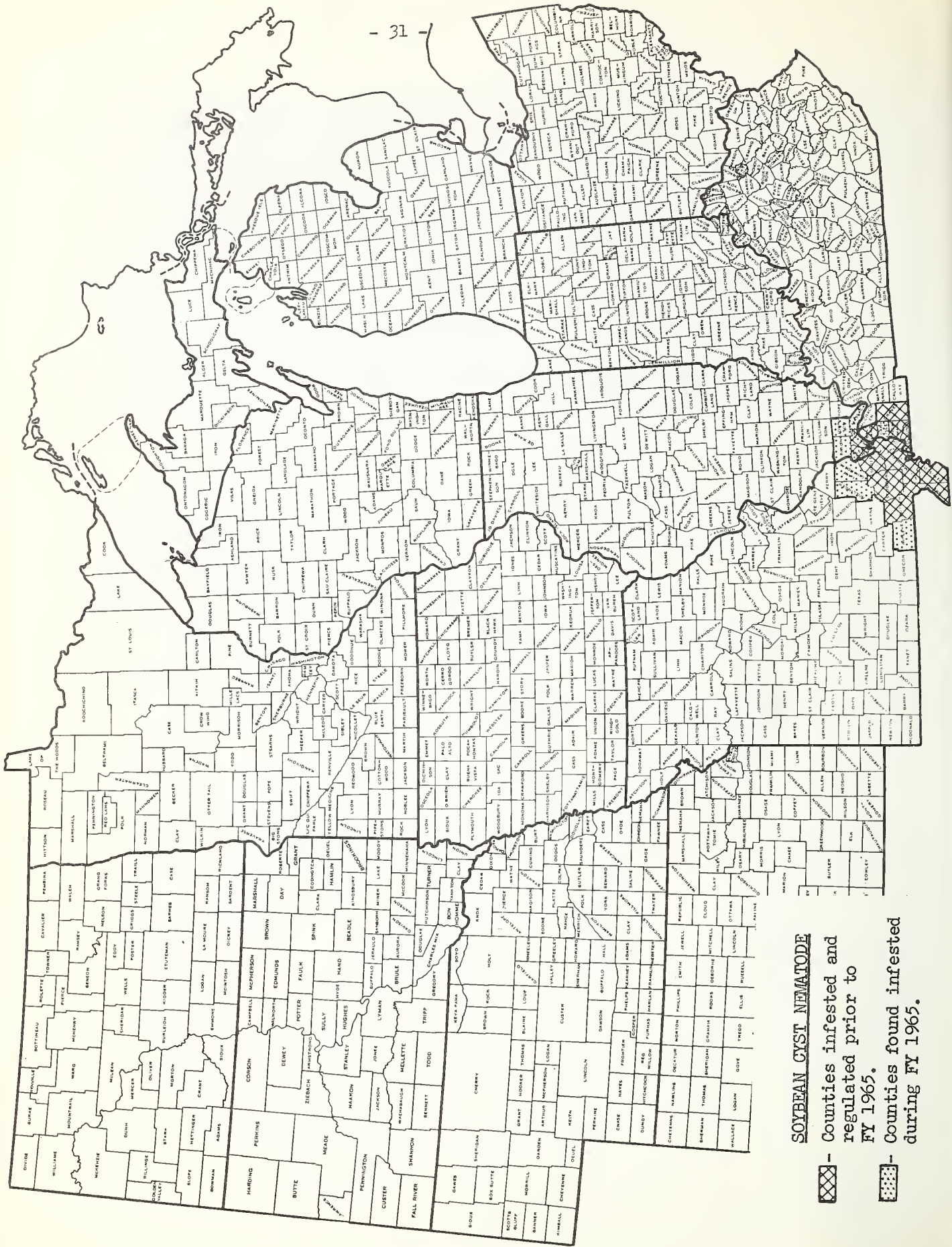
Federal or State regulated areas cover parts or all of the infested counties in the three-state area: Illinois--Alexander, Johnson, Massac, Pulaski, Union; Kentucky--Ballard, Carlton, Fulton, Graves, Hickman; Missouri--Bollinger, Butler, Cape Girardeau, Dunklin, Mississippi, New Madrid, Pemiscot, Scott, and Stoddard.

Regulatory activities continue to be an important part of this program. Within the regulated areas fumigation, pressure-washing, steam-cleaning, and bean-seed inspection are the means of certifying various articles or commodities for movement out of the area. Such items as cotton pickers, soil samples sent to laboratories, sawdust (nursery use), and bean trash (cattle feed) have been fumigated; steam-cleaning or washing has been the means of removing soil from farm machinery--both privately-owned and that being sold by auction at sales lots--construction equipment, etc.; while seed beans have been examined for the presence of soil peds.

Soybean Cyst Nematode - FY 1965

State	Survey and Detection				Regulatory		
	Surveyed		Infested		Acres	Properties	
	Prop-		Prop-		Nur-	In-	
	erties	Acres	erties	Acres	sery	Other	spected
Illinois	1,143	58,111	62	3,114	1	20	2
Indiana	2	50	-	-	-	-	-
Iowa	455	12,573	-	-	-	-	-
Kentucky	1,002	66,451	11	502	-	-	1
Minnesota	316	7,853	-	-	-	-	-
Missouri	925	38,729	39	2,958	2	3	-
Totals	3,843	183,767	112	6,574	3	23	3





**SOYBEAN CYST NEMATODE**

- Counties infested and regulated prior to FY 1965.

- Counties found infested during FY 1965.





# WHITE-FRINGED BEETLE

The white-fringed beetle has been detected at three different locations in southwestern Kentucky since September 1960. On that date it was found at a single location in Fulton County. In July 1962, it was observed in a small area in Galloway County and, again in the same county, south of the town of Murray on August 31, 1964. In each instance the Plant Pest Control Division and the State co-operated in hand-treating small acreages with 10-percent granular dieldrin.

In May 1965, fifteen acres of the Hale Auction Company sales lot at Sikeston, Missouri, were also hand-treated by Federal and State personnel with dieldrin furnished by the State. The beetle has not been found at this location, and the treatment was a precautionary measure since farm machinery is moved into the area from long distances.

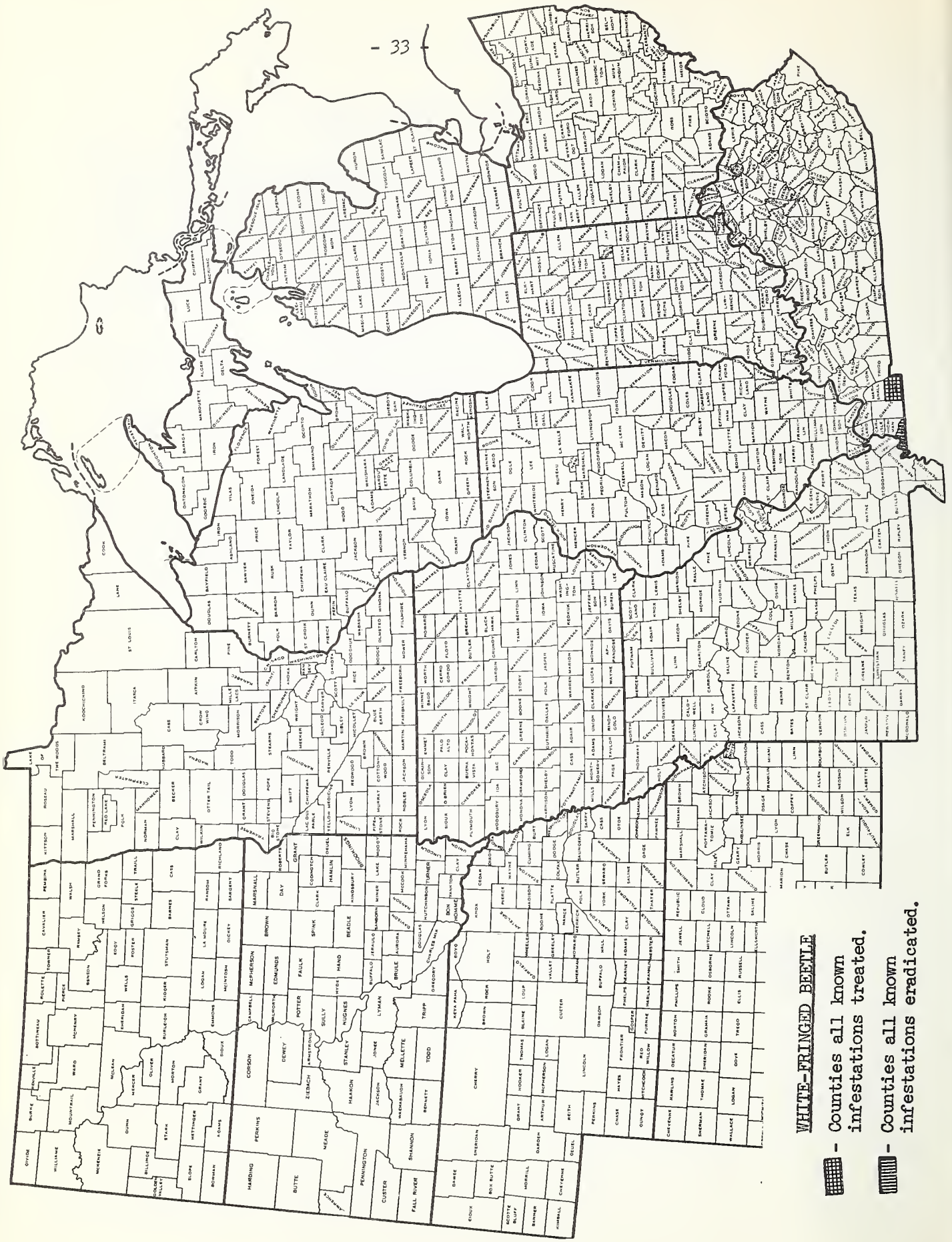
Surveys made to date in all other locations have been negative. Visual observations were made along railroads, in cemeteries, schoolyards, stockyards, and in residential areas in western Kentucky, southern Illinois, southern Indiana, and southeastern Missouri counties and in the City of St. Louis.

## White-fringed Beetle - FY 1965

		:Survey & Detection:		Control:		Regulatory			
State	:	:	:	:	:	Acres	:	Prop-	Acres
	:	Acres	:	:	:	Inspected	:	erties	Treated
	:	Sur-	:	Acres	:	Nur-	:	In-	Foli-
	:	veyed	:	Infested	:	Treated	:	sery	Other:spected:Soil: age
Kentucky		<u>16</u>		<u>16</u>					
Totals		16		16					

Missouri: 589 properties surveyed.





**WHITE-FRINGED BEETLE**

- [Grid of small squares] - Counties all known infestations treated.
- [Grid of small squares] - Counties all known infestations eradicated.



WITCHWEED

Witchweed is not known to occur in the Central Region States. Plant Pest Control inspectors, while on other program activities, have carried on detection surveys for this parasitic plant pest. This was especially true of inspectors in Iowa, Kentucky, and Missouri.

Witchweed - FY 1965

State	:Survey & Detection:Control:				Regulatory	
	: Properties :	: Acres :	Prop- erties :	: Acres :	: Inspected	
	: Surveyed:	Infested:	Treated:	Inspected:	Nursery :	Other
Iowa	589					
Kentucky	570					
Missouri	166					
Total	1,325					

DETERMINATION OF IMPACT OF AGRICULTURAL PESTICIDES  
ON THE ENVIRONMENT (DIAP)

The purpose of the DIAP program is to determine if significant environmental hazards are resulting from normal agricultural use of pesticides. This information will be gathered by periodic intensive monitoring of study areas.

Study objectives include:

1. Establishing trends of depletion or accumulation of residues.
2. Determining levels of pesticides in soils, water, and agricultural food and feed products.
3. Studying the impact of agricultural pesticides on non-target organisms.
4. Recording results of studies and developing reports for appropriate distribution.

In the fall of 1964, cooperators were contacted and a study area was established in the Red River Valley of Minnesota and North Dakota, near Grand Forks, North Dakota. The area consists of two farms, each approximately 640 acres in size, one in North Dakota and one in Minnesota.



In October and November, the farms were divided into sampling blocks and mapped according to land use. Samples of soil, water, sediment, crops, and soil insects totaling 110 were collected from the two farms. These were submitted to the Gulfport Laboratory for chemical analysis. During the winter and early spring, pesticide and land use histories, covering a period of ten years where possible, were obtained and recorded on each study farm. A building was obtained in Grand Forks, North Dakota, in which a chemical laboratory and a field office were established under the direction of Mr. W. J. Brandvik. Each farm was remapped and sampling blocks established according to current land uses. Weather stations have been established on each site to record temperature, humidity, and rainfall throughout the growing season. Sampling of soil, water, sediment, wildlife, and aquatics continued during the spring and summer on both study sites. A total of 283 samples was collected during the year. These samples were processed in the chemical laboratory by the chemist who extracted and composited them for submission to the Gulfport Laboratory for chemical analysis.

In Illinois and Iowa cooperators were contacted and five special study farms were established in each State. Only farms that had a history of persistent pesticides use were selected. Past histories as to pesticide usage on each farm were collected and recorded. One field from each farm was selected for sampling. Soil samples only were collected from five one-acre plots from each selected field. These samples were collected prior to planting of the fields and submitted to the chemical laboratory in Grand Forks for extraction. Each one-acre plot will be resampled in the fall, following harvest.

In Michigan, cooperators were contacted in an effort to establish five special study farms in a fruit-growing area in Berrien County. Five fruit growers, willing to cooperate in the program, were located. A history of pesticide uses and cropping practices is being compiled for each farm. Soil samples will be collected from five one-acre plots from one selected field on each farm. The first samples are to be taken after the control season next fall.

Excellent cooperation from the public and other Government agencies has made it possible for this program to get under way.

#### SAFETY AND PROGRAM MONITORING

Safety has been one of the important parts of all programs in the Central Region. Safety information has been made available to all Plant Pest Control personnel through memorandums, bulletins, safety films, copies of safety items, and posters. Supervisory personnel have discussed safety at conferences, district meetings,



and with individuals on the job. Safety checks have been made by supervisors while on the job in the field, at storage sites, in vehicles, and in the office. The President's "Mission Safety--70" program has received special emphasis.

The monitoring of control program activities, with greater emphasis on insecticide safety compliance, has also been carried out. Whenever necessary, areas treated for the control of cereal leaf beetles, grasshoppers, and Japanese beetles were checked to see that application equipment was properly calibrated; that property owners were notified of the work to be done; that the insecticide was properly applied; and that ponds and watercourses were omitted from the control area. Checks were also made at the conclusion of these programs to be sure that all empty insecticide drums were disposed of in the approved manner, and that any still containing insecticide were placed in safe storage. Supervisors also outlined the safety measures to be followed in each control program when submitting work plans. In all control programs very close liaison is maintained with various State and Federal agencies who cooperate in the work or are otherwise interested in it.

A cooperative agreement was signed with Michigan State University for the monitoring of areas treated for cereal leaf beetle control in Michigan during fiscal year 1965.

#### ASSOCIATED ACTIVITIES

Activities associated with the regional Plant Pest Control programs were many and varied. Emphasis was on the informational phase in all instances. The general public, agricultural groups, industry, and other interested parties were kept informed of the progress, accomplishments, and status of the Plant Pest Control programs.

Barberry eradication, cereal leaf beetle, grasshopper control, gypsy moth, Japanese beetle, and soybean cyst nematode programs received the major emphasis. Supervisors have assisted with newspaper items, radio tapes, television interviews, and feature articles to keep the public informed. In addition, many supervisors have been called upon to speak at public meetings, university seminars, etc., or to supply program aids such as literature, traps, slide series, or films for use by others at similar meetings. Various universities and other schools in the Region made good use of films dealing with such programs as barberry eradication, grasshoppers, and Japanese beetle in classroom instruction or short courses.

Many exhibits and demonstrations were displayed at State and county fairs, garden-club and flower shows, agricultural meetings,



grain and industrial shows, and at other similar affairs. Supervisors were called upon to also place various program displays in banks, store windows, county and university buildings, and schools. Riker mounts, specimen material mounted in plastic, photos, and program literature were used many times as supplemental information.



Exhibits developed by the Plant Pest Control Division, displayed at Maumee, Ohio, in June 1965. (One panel tells story of Plant Pest Control Division; the other tells story of the cereal leaf beetle.)



Versa-panel exhibits were used together in Missouri in 1965, to effectively tell the public about the soybean cyst nematode problem.



Summary of Associated Activities, by Programs, in Central Region - Fiscal Year 1965

Program	Public Meetings Attended			Presentations			Feature & News Stories			Extent These Aids Were Used			Special Man Hrs.		
	Public Meetings Attended	Talks	Slides	Films	Radio	TV	Exhibits	Bulletins	Circulars	Infes. Maps	Reports	Asst.	Special Man Hrs.	Tech.	Asst.
BE	1	6	1	64	-	-	20	5	1,060	6,128	170	4	20		
CLB	5	28	1	-	1	1	2	4	3,424	2,011	641	2	117		
GC	-	2	2	8	-	1	25	3	50	313	720	-	-		
GM	-	-	-	1	-	-	-	-	1,011	325	2	-	-		
GN	-	-	-	1	-	-	-	-	-	-	16	-	-		
IFA	-	-	-	-	-	-	-	-	-	2	27	-	-		
ID	-	-	-	-	-	-	-	1	-	-	4	-	-		
JB	1	2	1	17	2	2	96	4	3,104	8,877	977	105	779		
KB	-	-	-	-	-	-	-	-	35	8	-	6	-		
PP	-	-	-	-	-	-	-	-	15	-	-	-	-		
SCN	3	5	10	-	-	-	1	3	1,151	889	261	1,300	8		
WFB	-	-	-	-	-	-	-	2	-	304	39	-	-		
WW	-	1	1	8	-	-	-	1	35	2	26	-	-		
Totals	10	44	16	99	3	4	144	23	9,885	18,859	2,883	1,417	924		



Summary of Associated Activities, by States, in Central Region - Fiscal Year 1965

State	Public Meetings Attended	Presentations					Feature & News Stories		Extent These Aids Were Used			Special Reports		Man Hrs.
		Talks	Slides	Films	Radio	TV	Exhibits	Bulletins	Circulars	Infes. Maps	Posters	Special Reports	Tech. Asst.	
Illinois	1	6	10	2	-	-	-	2,533	-	185	-	-	-	-
Indiana	1	-	-	6	-	-	91	558	478	625	106	-	-	-
Iowa	-	-	-	-	-	-	-	-	110	-	-	-	-	-
Kansas	-	2	-	4	-	-	10	-	-	194	-	-	-	-
Kentucky	-	-	-	-	-	-	5	1,060	5,650	60	-	-	-	39
Michigan	1	4	-	1	2	1	1	4,553	-	124	1	1	30	-
Minnesota	-	3	3	44	-	-	-	225	132	256	-	-	-	-
Missouri	3	2	2	-	-	-	-	-	3,720	116	1,300	-	-	-
Nebraska	-	-	-	4	-	2	35	-	-	342	10	-	-	-
Ohio	4	23	-	27	1	1	2	885	7,951	380	-	-	855	-
Wisconsin	-	4	1	11	-	-	-	71	818	401	-	-	-	-
Totals	10	44	16	99	3	4	144	9,885	18,859	2,883	1,417	-	924	-











PART III







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P L A N T   P E S T   C O N T R O L   D I V I S I O N

COOPERATIVE PROGRAMS

EASTERN REGION

FISCAL YEAR

1965

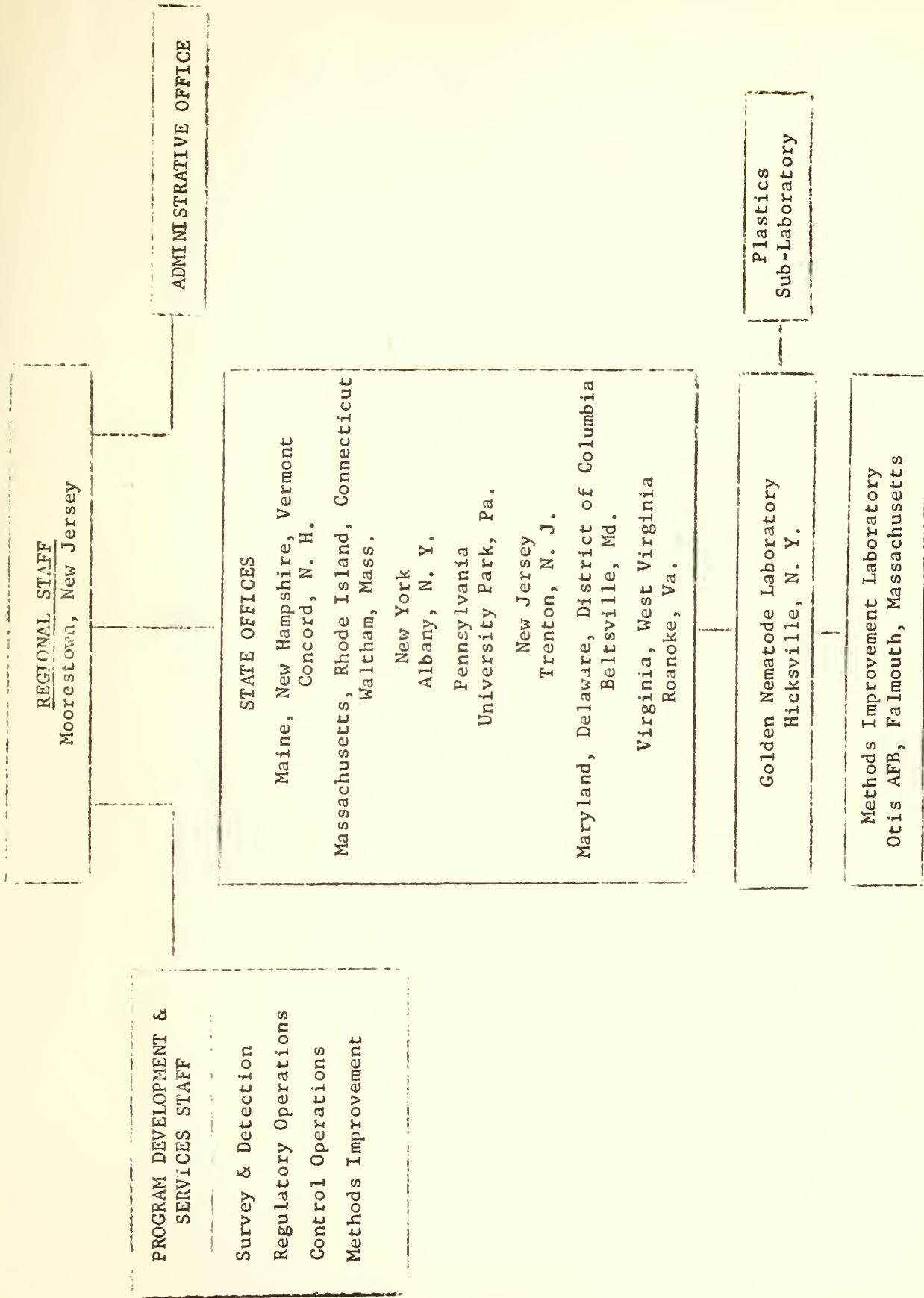
November 1965  
Moorestown, New Jersey

U. S. Department of Agriculture  
Agricultural Research Service  
Plant Pest Control Division















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BARBERRY ERADICATION

Fiscal Year 1965

The barberry eradication program was continued in cooperation with the States of Pennsylvania, Virginia, and West Virginia. Rework requirements were emphasized. In addition, some initial work was scheduled and accomplished in all three states. A total of 3,462,476 rust spreading barberry bushes was destroyed on 1,008 old properties and 357 new properties. Also, 209 properties were relegated to the inactive status and 728 square miles were placed under maintenance.

As a result of examination of barberry, mahoberberis, and mahonia in growing plots of nurseries, and arrangements made with dealers, 212 establishments were authorized to move such plants interstate. Included in this total are two seed growers. Regulatory activities also included inspection of barberry plants in postentry status, and applications from nurseries to receive one-year old seedlings.



Evaluations of work programs and procedures were made in all three States in the interest of determining that the most practicable current approaches are being followed.

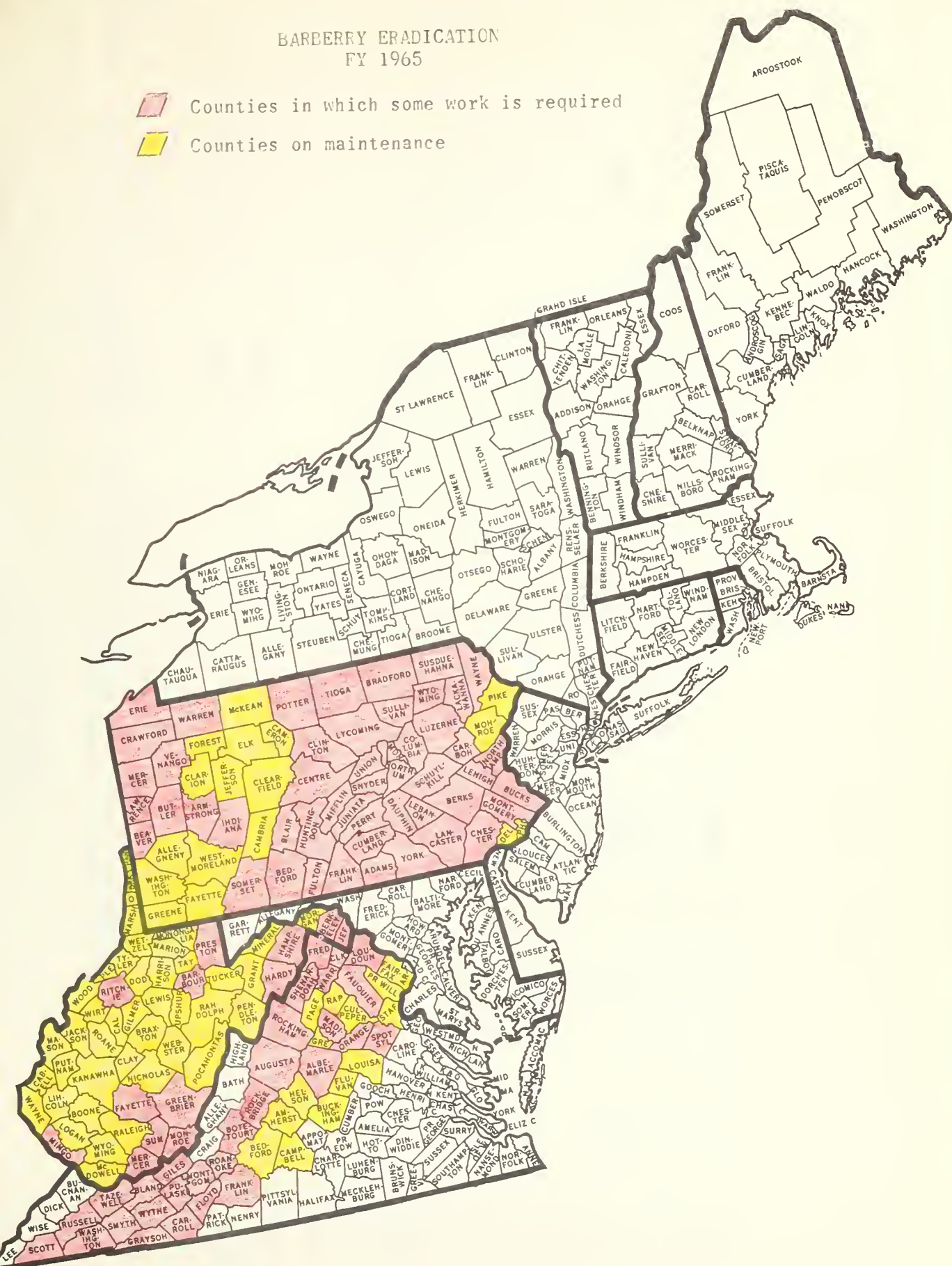






BARBERRY ERADICATION  
FY 1965

-  Counties in which some work is required
-  Counties on maintenance









BARBERRY ERADICATION  
Fiscal Year 1965

State	SURVEY AND DETECTION			CONTROL Plants Destroyed	REGULATORY		
	Sq. Mi. Surveyed	Properties Reinspected	No. Properties Found With Bushes		Nurseries		Other Properties Inspected
					No.	Acres	
Conn.					7	911	2
Del.					12	2351	
D. C.					3		
Md.					28	2410	
Mass.					16	1486	
N. J.					47	4643	1
N. Y.					24	3630	6
Pa.	1601	1532	819	32605	39	3064	9
R. I.					18	1470	
Va.	121	347	280	1146468	27	7508	1
W. Va.	73	316	266	2283403	6	654	2
Total	1795	2195	1365	3462476	227	28127	21







BROWN-TAIL MOTH

Fiscal Year 1965

State-Federal scouting surveys were conducted in six States - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. In three States - Connecticut, Rhode Island and Vermont - results were negative. Similar results were recorded in Maine with the exception of one small infestation, comprising about two acres, in the Town of Acton, York County. Scattered light infestations were located in three New Hampshire Counties - Hillsboro, Merrimack and Carroll. In Massachusetts, no evidence of infestation was found in previously infested areas of Deer and Massachusetts Islands, Suffolk County, or on Plum Island, Essex County. Known established infestations at Dennis, Sandy Neck, and Provincetown-Truro in Barnstable County were delimited.

Control activities involved web cutting during the winter months and applications of insecticides in the spring. At Acton, Maine, the State Forest Service sprayed the known infestation with DDT. In New Hampshire, the State Department of Agriculture sprayed ten acres with Sevin in Moultenboro and cut webs in that town, Canterbury, Loudon, Hooksett, Weare, and Francistown. The major control effort in Massachusetts was made on the Cape Cod National Seashore Park where the National Park Service sprayed 670 acres with Sevin. Town officials at Dennis and Sandy Neck arranged for the clipping of webs.

At a public hearing held in New York City on December 16, 1964, reduction of the areas regulated on account of the brown-tail moth was proposed by the Division. There was general agreement with the proposal.

Response by the States concerned and others cooperating in renewed efforts to locate and eliminate current limited infestations of this pest are encouraging.







COOPERATIVE ECONOMIC INSECT SURVEY

Fiscal Year 1965

Close working relations were maintained with survey coordinators in all states. Five states participated in special workshops held to encourage greater participation in cooperative insect detection surveys.

During the year, two European insect pests, not previously recorded in the United States, were discovered. A weevil, Pachytychius haematocephalus, a pest of birdsfoot trefoil was collected in New York by an inspector employed by the cooperating State agency. In New Jersey, a Division inspector collected an unfamiliar scarabaeid beetle. This was identified as Anomala ausonia Et., a pest of grapes known to occur in Germany, Italy and Sicily.

In order to be on the alert for possible introductions in the vicinity of ports of entry, black light traps were operated in seven Eastern Region states and the District of Columbia. In this work, 19 traps were utilized at 26 commercial and military airfields, sea ports and harbors. Generally, traps were operated one night a week from early June to late September. After screening of collected materials specimens were sent to cooperating state entomologists for further identification. Specimens which required special taxonomic attention were forwarded to the Insect Identification Section, Washington, D. C.

Fruit fly detection surveys were conducted in eight Eastern Region states and the District of Columbia. Sticky-board traps, as well as the conventional McPhail and Steiner traps were utilized. Traps were placed at principal ports of entry, as well as at commercial locations of possible introduction. No species not known to occur in the United States were trapped.

In view of the continuing spread of cereal leaf beetle in the Central States, observations and sweepings were made at selected sites throughout the Region where host products had been received from infested states. Results were negative.

In consideration of the presence of winter moth, Operophtera brumata, in Nova Scotia and New Brunswick, Canada, survey operations were again conducted in the coastal areas of Maine from Ellsworth east to Calais. Twenty battery-operated black light traps were utilized. To supplement the trapping operation, the procedure of banding trees with tanglefoot was again followed. No evidence of infestation was found.







EUROPEAN CHAFER

Fiscal Year 1965

During the summer of 1964 survey operations were conducted in all States within the Eastern Region except Virginia. Chemical and black-light traps were used extensively; visual observations were made primarily in delimiting operations.

Survey results in Capon Bridge and other sections of West Virginia were again negative. Adults specimens were recovered in the States of Connecticut, New Jersey, New York and Pennsylvania. In Connecticut, no positive catches outside previously known infested areas were recorded. No evidence of infestation was encountered in New Jersey outside areas where control treatments had previously been applied. Survey results in Pennsylvania were negative except for an eastward extension of the Erie infestation. Initial findings were recorded in two New York Counties - Yates and Broome. Extensions of previously determined infestations in Cayuga, Genesee, Niagara, Schuyler, Cortland, and Oswego Counties, New York were also recorded.

Treatment of the entire known infested area at Erie, Pennsylvania was deferred pending acquisition of information obtainable on a comprehensive delimiting survey during the summer of 1965. However, the known core of the infestation, comprising about 10 acres along railroad rights-of-way, was treated in the spring of 1965. In New Jersey, residual soil treatments were applied in the fall of 1964 at Interchange 14-B (Jersey City) of the New Jersey Turnpike and adjacent lands.

Regulatory services were provided throughout the year.

As a means of reducing hazard of spread by departing aircraft, Hancock Airport at Syracuse, New York applied residual soil treatments on 125 acres of turf.

Following a public hearing in New York City on December 16, 1964, it was decided not to extend the Federal quarantine to the States of New Jersey and Pennsylvania in view of actions taken and proposed by those States.

In May 1965, Federal Quarantine No. 77 and associated administrative instructions were revised. Changes in regulated areas involved the addition of territory in New York State. The designation of West Virginia as a quarantined State was removed.

Funds and facilities to properly cope with this problem were inadequate as in past years. Detection tools, control methods, research, and means to effect general prevention of spread measures are appreciably short of requirements. Whereas plant growing and other commercial establishments within and near infested areas are making a substantial contribution to preventing dissemination of this insect, it is obvious that currently available assets and approaches are insufficient to meet Division program objectives.

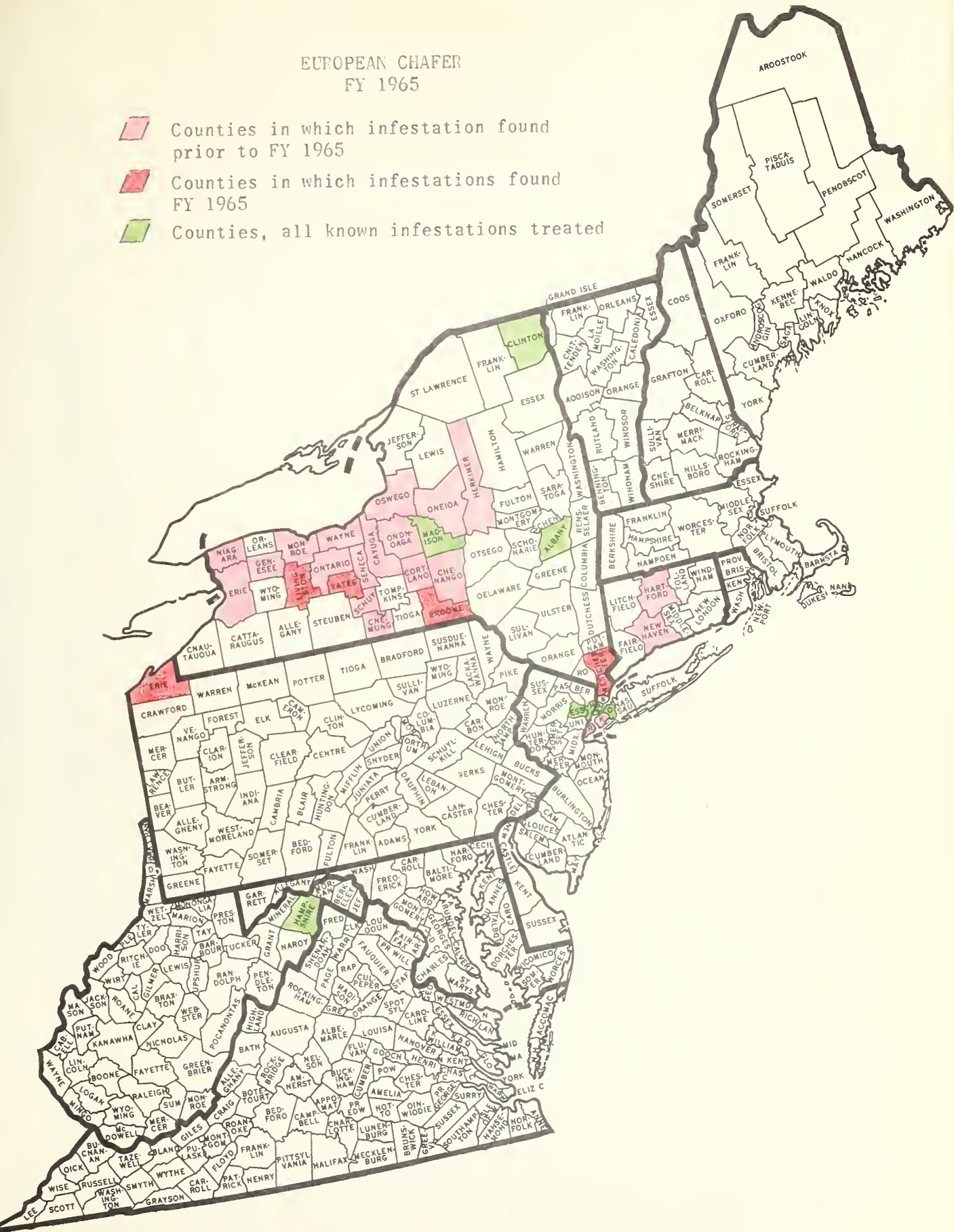






# EUROPEAN CHAFER FY 1965

- Counties in which infestation found prior to FY 1965
- Counties in which infestations found FY 1965
- Counties, all known infestations treated





11

12

13



EUROPEAN CHAFER  
Fiscal Year 1965

State	SURVEY AND DETECTION			CONTROL Acres Treated	REGULATORY			Other Properties Inspected
	Sites Trapped	Acres Infested			Nurseries		Soil Treated	
					Acres Inspected	Acres		
Conn.	219							8
Del.	18							
D. C.	1							
Me.	36							
Md.	46							1
Mass.	368							
N. H.	23							
N. J.	600	137		137				
N. Y.	4029	9500			3110			19
Pa.	1651	9350		10	26			7
R. I.	24							
Vt.	188							
Va.								1
W. Va.	60							1
Total	7263	18987		147	3136			37







GOLDEN NEMATODE

Fiscal Year 1965

During the year intensive survey activities were expanded in the principal potato production areas on Long Island, most of which are in Suffolk County. This work revealed infestations on four fields in Suffolk County and one field in Nassau County, aggregating 134 acres.

Outside Long Island, surveys were conducted at field sites and grader stations in the States of Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, and Vermont. All results were negative.

Fumigation treatments for eradication were applied during the summer of 1964 on 15 fields, containing a total of 499 acres. Included were eight newly infested fields, an experimental field at Merrick, and six previously treated fields from which viable cysts were recovered on post-fumigation surveys. The State of New York continued its compensation program as a means of withholding known infested lands from potato production. This provision continues to be of assistance and at the completion of this year's treating program all active potato land known to be infested had been fumigated. However, certain lands utilized for the growth of truck crops and sod or awaiting real estate development were not treated. While current fumigation procedures are contributing substantially to prevention of spread, achievement of the eradication goal will be delayed for an indefinite period of years in the absence of a more aggressive approach to prompt fumigation of all known infested properties.

The Division continued to cooperate with the New York Department of Agriculture and Markets in the enforcement of State quarantine regulations. These activities necessitated an increase in regulatory calls. Potato growers and others directly affected extended noteworthy cooperation.



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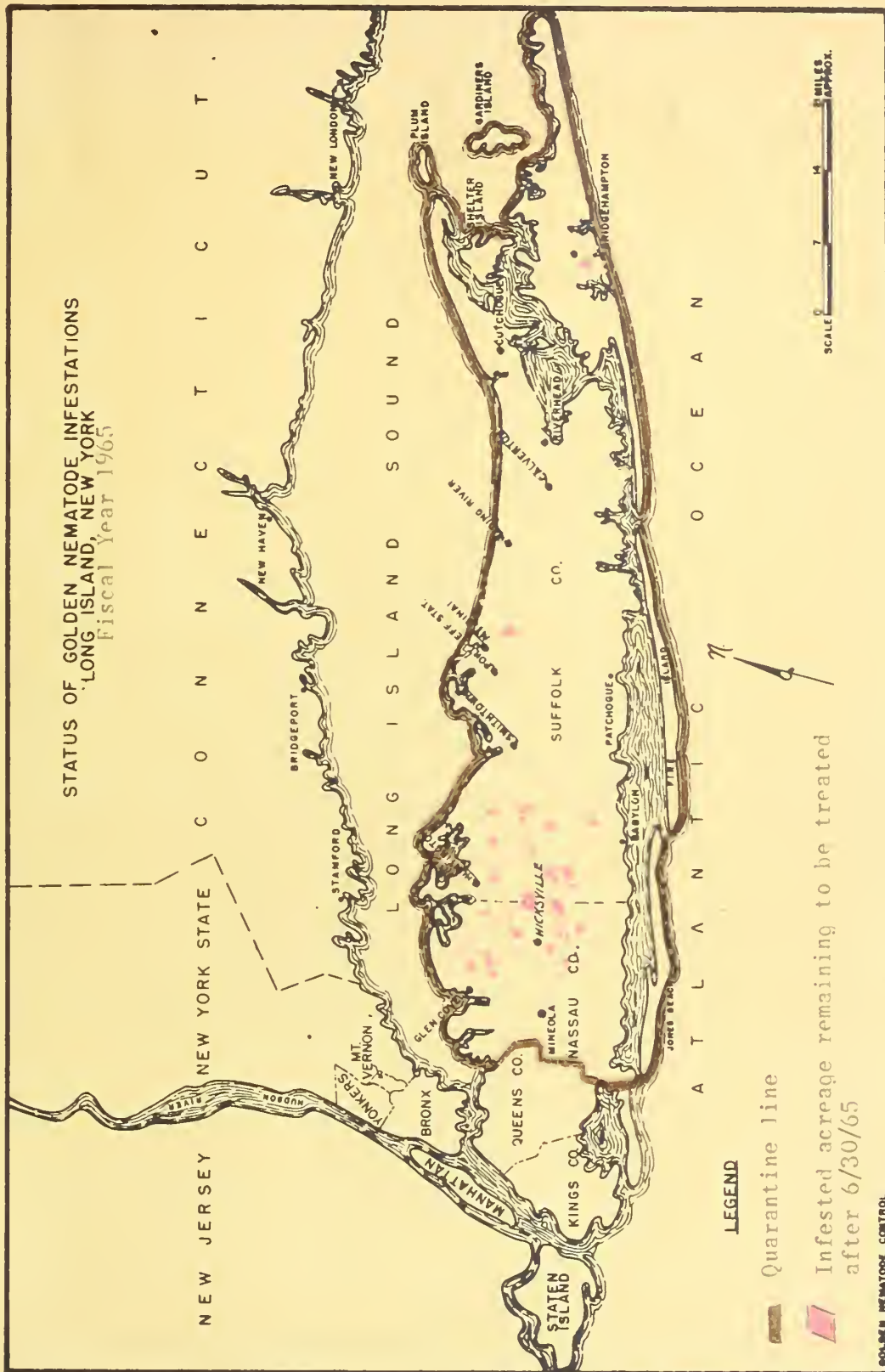
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# STATUS OF GOLDEN NEMATODE INFESTATIONS LONG ISLAND, NEW YORK Fiscal Year 1965









GOLDEN NEMATODE  
Fiscal Year 1965

State	SURVEY AND DETECTION					CONTROL		REGULATORY
	Inspected		Infested		Acres	Acres Fumigated	Potato Grading Station Inspections	
	Properties	Acres	Properties	Acres				
Del.	13	1010						
Me.	493	22056						
Md.	61	3076						
Mass.	14	260						
N. H.	16	960						
N. J.	162	4489						
N. Y.	627	24537	5	134	499	2674		
Pa.	300	14474						
Vt.	22	1065						
Va.	167	4979						
Total	1875	76906	5	134	499	2674		







GYPSY MOTH

Fiscal Year 1965

Survey was conducted in all states within the Region except those known to be generally infested. A total of 47,120 traps was operated for detection or delimiting purposes (June-September) in Pennsylvania, New York, New Jersey and non-regulated sections of northern New England. In addition, traps were placed at selected locations in Delaware, Maryland, Virginia, and West Virginia. Traps were charged initially with synthetic gyplure attractant and at mid-season were rebaited with natural attractant. Limited visual scouting for egg clusters was conducted at selected positive trap sites.

Trapping and scouting surveys revealed infestations within the suppressive area and at several locations in non-regulated sections of New York, New Jersey, Pennsylvania and Vermont. Of particular note in New York was the finding of infestation at Syracuse, Onondaga County, and in Orleans and Clayton Townships of Jefferson County, locations considerably to the west of the regulated area. Within the suppressive area concentrations of trap catches were encountered in Sullivan and Orange Counties, and at Kirkland, Oneida County, a number of egg masses were found in the vicinity of a positive trap site. In northeastern Pennsylvania, there were three positive trap sites, two in Pike County and one in Monroe County. Egg masses were found at two of the involved sites. Of note in the New Jersey survey were the numerous finds again encountered in the Watchung area of Somerset County, lower Hunterdon County, and in Princeton Township, Mercer County. In the non-regulated area of Vermont, scattered trap recoveries were made in Franklin, Lamoille, Caledonia and Orleans Counties.

Under the cooperative Federal-State gypsy moth control program, a total of 56,578 acres was treated in Pennsylvania, New Jersey and New York. Included were all known infestations in Pennsylvania, and peripheral areas of infestation in New Jersey and New York. Most of the 28 spray blocks in New York were within the suppressive area. Sevin was used exclusively in a water-base formulation at the rate of one pound per gallon per acre in all spray blocks except in New York where DDT was used in one of the spray blocks at the 1/2 pound per gallon per acre. All applications were by aircraft except 182 acres on which the insecticides were applied with ground equipment.

State and local agencies in Connecticut, Massachusetts, New Jersey, New York, Rhode Island, and Vermont treated 201,947 acres within the generally infested area to suppress heavy moth populations and prevent defoliation. Sevin was applied on 157,342 acres at the one pound per gallon per acre rate and DDT was used on 44,605 acres at the rate of 1/2 pound per gallon per acre.

A total of 263,201 acres of defoliation was recorded in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut and New York. This represents a slight increase over the previous year when 254,983 acres were defoliated. The largest increase was recorded in New York, 148,360 acres as against 97,237 acres in 1964.







## GYPSY MOTH (cont'd)

Regulatory services provided throughout the year involved inspections at processing, industrial and shipping sites, as well as field inspections of nurseries and other premises. Nursery establishments applied control treatments to growing plots and borders to maintain certification status.

Approximately 300 establishments and dealers were authorized to move mined, manufactured, or quarried stone, and quarry products under Certificate of Exemption. Special exemption from certification use granted to certain timber shippers who move products to Canada, which was initiated May 19, 1960, remained in effect.

Information was presented at a public hearing held at New York City on December 16, 1964, regarding quarantining New Jersey and Pennsylvania on account of the gypsy moth, and the status of brown-tail moth infestations and quarantine regulations.

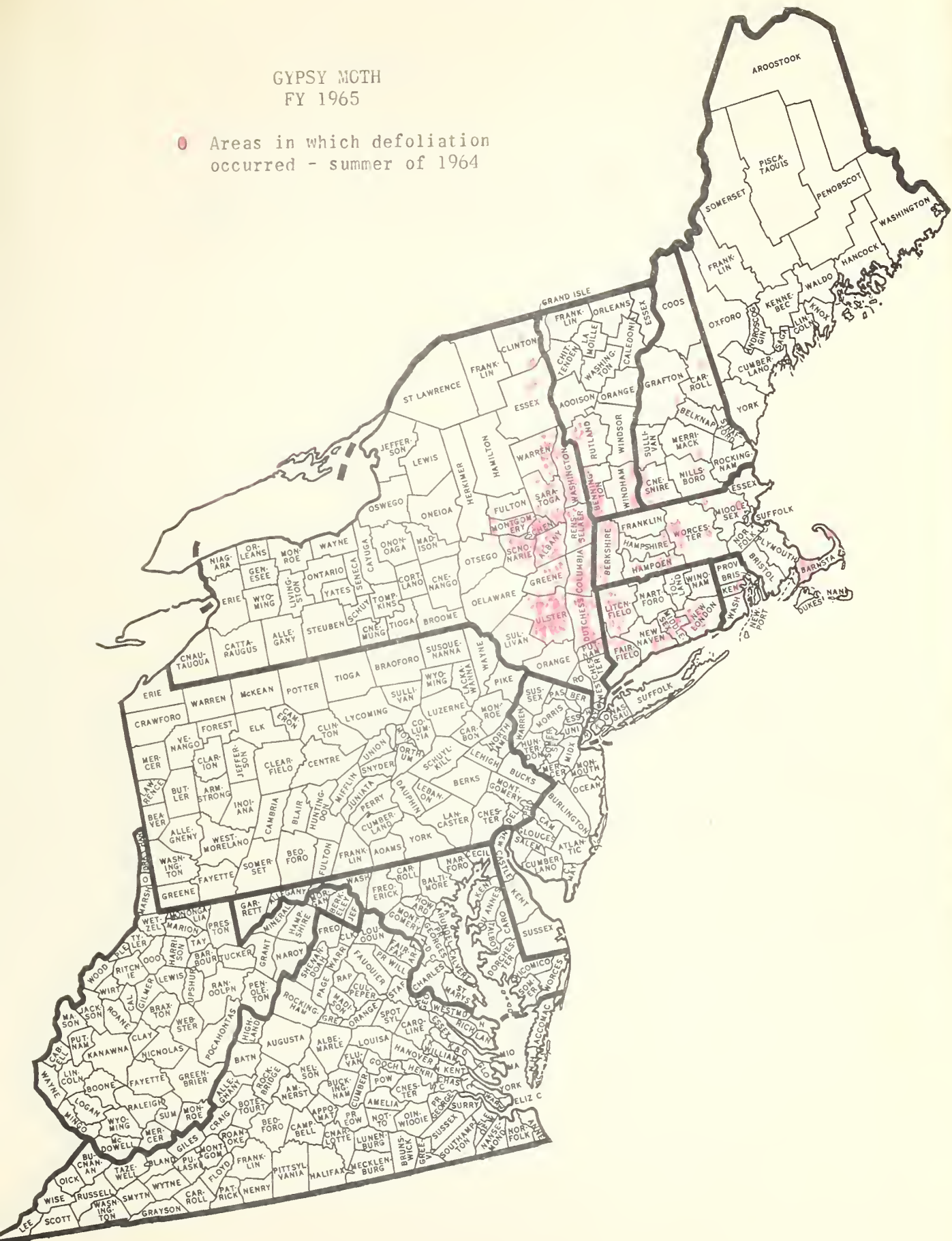






# GYPSY MOTH FY 1965

○ Areas in which defoliation occurred - summer of 1964



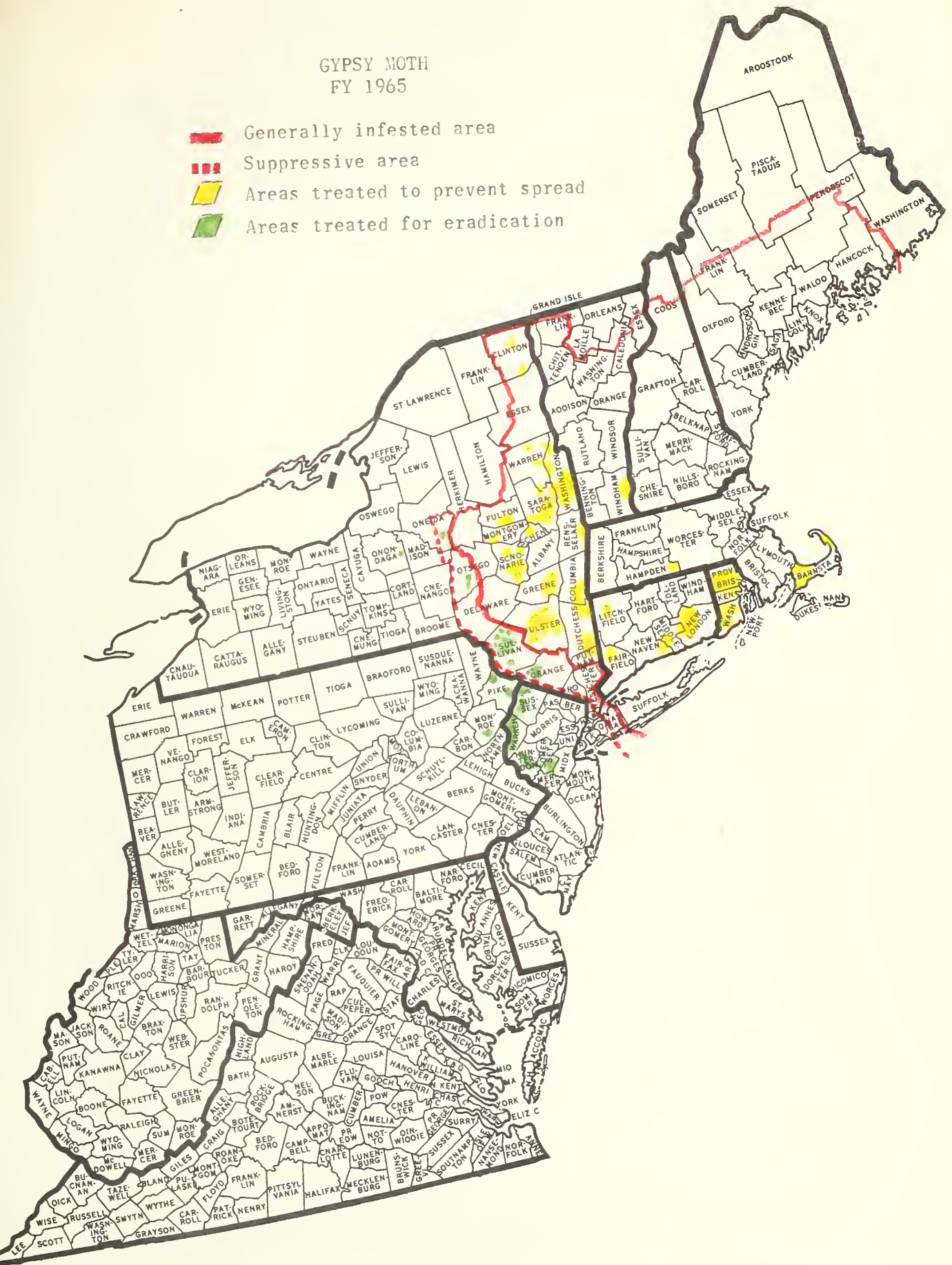






# GYPSY MOTH FY 1965

- Generally infested area
- ▨ Suppressive area
- Areas treated to prevent spread
- Areas treated for eradication









GYPSY MOTH  
Fiscal Year 1965

State	SURVEY AND DETECTION			CONTROL		REGULATORY				
	Trapped	Sites	Positive	Chemical	Acres Treated	Acres Inspected		Properties Inspected		Acres Foliage Treated
						Nursery	Other	Industrial	Other	
Conn.						8660	294	244	42	1936
Del.	26									
D. C.	3									
Me.	1274					173	11218	181	298	
Md.	346									
Mass.						2549	5924	745	59	
N. H.						333	1841	102	247	
N. J.	8078			23145	126322					
N. Y.	24283			25187	5664	3546	12097	1850	473	
Pa.	18588			8246	1280			117	55	
R. I.						266	23	34	21	
Vt.	1801	18				37	16133	404	764	
Va.	1140									
W. Va.	880									
Total	56419	18		56578	133266	15564	47530	3677	1959	1936







JAPANESE BEETLE

Fiscal Year 1965

An extensive trapping survey conducted in non-regulated sections of Maine between July 9 and September 10, 1964, failed to reveal new infestations. The remainder of this Region is under regulation.

Regulatory services were provided throughout the year to establishments and individuals concerned with movement of plants, soil, and other regulated products.

Seasonal restrictions were effected during the adult flight period in several southwestern Virginia Counties. Produce with an estimated value of almost \$60,000 was inspected or fumigated for certified movement from that area. Produce loading sites, fields, and roadsides in the counties involved received foliar insecticide treatments applied by the State of Virginia between July 1 and September 1. Special restrictions imposed by the State of Tennessee on the movement of green beans, in particular, necessitated added inconveniences to growers, as well as Division expenditures.

During the adult flight season no airports in this Region were declared hazardous. However, aircraft stopping at Ohio fields declared hazardous, enroute to non-regulated destinations, were treated prior to departure from six airports in this Region.

No control treatments were necessary in the limited non-regulated territory in this Region. Assistance was given to military and civilian airports where control measures of a continuing or progressive nature are in effect. As previously reported, residual soil treatments were applied voluntarily by the principal military and commercial airfield operators in the Region.

Twenty-two colonies of the Japanese beetle parasite Tiphia vernalis were collected in West Virginia and shipped to locations in the Southern and Central Regions for release in areas where they are not known to occur. Additional colonies were also collected for release in areas of West Virginia where they were not known to exist.

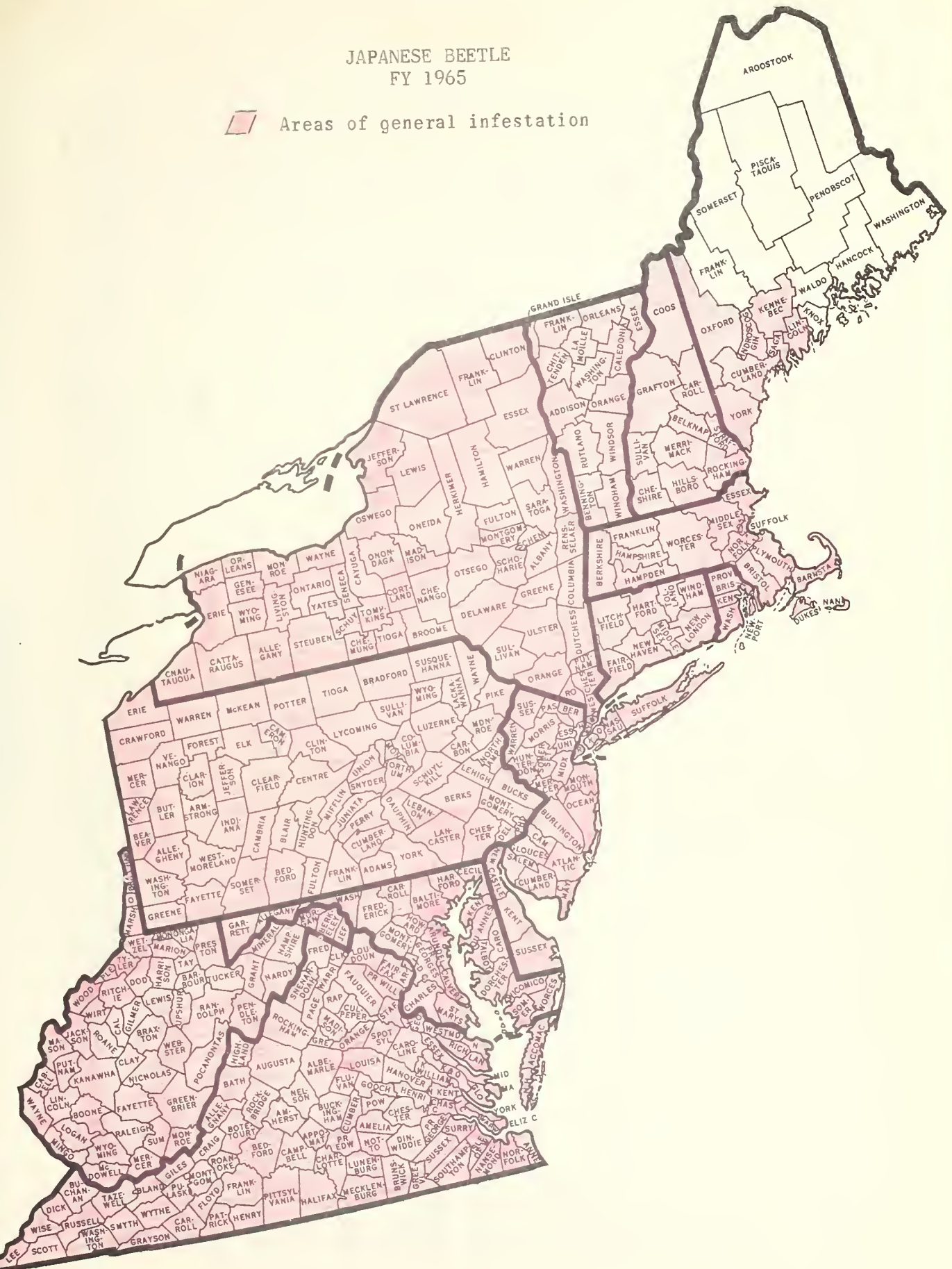






JAPANESE BEETLE  
FY 1965

 Areas of general infestation









JAPANESE BEETLE  
Fiscal Year 1965

State	SURVEY AND DETECTION		CONTROL		REGULATORY				
	Sites Trapped	Acres Infested	Chemical Acres	Biological No. Parasites Released	Acres Inspected Nursery	Other	Industrial	Other	Acres Treated Soil Foliage
Conn.					155	31	354	5	
Del.								3	
D. C.								750	
Me.	876				2683	24		62	
Md.						1			18
Mass.					22	4	66	215	7
N. H.					4205	286		118	
N. J.									526
N. Y.					8459	23	188	11	1173
Pa.					2098	886		460	188
R. I.							19	5	42
Vt.					101	155		72	
Va.					246	3740			814 4094
W. Va.									30 1900
Total	876				17814	5119	428	974	3905 5999







KHAPRA BEETLE

Fiscal Year 1965

Survey for khapra beetle in the Eastern Region was conducted on a selective basis. Emphasis was placed on checking sites or distributors involved in the storage or movement of commodities originating in suspect areas or conveyances. Related inspections were made of furniture plants which had received suspect materials, grain and feed storehouses, bagging companies, hide importers, railroad cars which had transported exposed materials, leather and rubber companies. Properties inspected in the States of Delaware, Maryland, New Jersey, New York and Pennsylvania totalled 180. Although numerous specimens were collected and submitted for identification, all proved negative.

When information received from the Plant Quarantine Division indicated that exposed or suspect materials or carriers had moved beyond port areas, appropriate action was taken by PPC personnel, working in close cooperation with officials of the involved State regulatory agency.







KHAPRA BEETLE  
Fiscal Year 1965

State	SURVEY AND DETECTION		CONTROL		REGULATORY		
	Properties		Fumigated Cubic Feet	Properties Inspected	Commodity Lots Treated	Transports Treated	
	Surveyed	Positive					
Del.	17						
Md.	31					3	
N. J.	114						
N. Y.	10						
Pa.	8			4	1	4	
Va.				1		1	
Total	180			5	1	8	







METHODS IMPROVEMENT

Fiscal Year 1965

BARBERRY ERADICATION:

Additional plots were established in Tazewell County, Virginia, and Potter County, Pennsylvania, to further evaluate the most promising herbicides tested in 1964.

BROWN-TAIL MOTH:

At Dennis, Massachusetts, a 73 acre plot was treated at the rate of one pound per acre of technical malathion in low volume. Results indicated that this was not an effective control. However, high mortality of tent caterpillars was observed.

EUROPEAN CHAFER:

Comparison tests with black-light and a new General Electric blue-green lamp, conducted at our request by Entomology Research Division's experimental station at Geneva, New York, proved the blue-green lamps to be inferior to the presently recommended black-light lamp.

No significant improvement in effectiveness was obtained in tests conducted to determine whether the European chafer black-light trap would be a more effective control tool when fortified with the lure n-butyl-sorbate.

Tests indicated there would be no advantage in adding n-butyl-sorbate to carbaryl sprays for adult European chafer control.

GOLDEN NEMATODE:

In cooperative fumigation tests with Cornell University, no significant differences resulted between plots treated with a double application of D-D at 45 gallons per application without tarps, similar treatments under tarp, 90 gallons per acre in one application with and without tarps, and 90 gallons per acre followed by a Vapam drench with and without tarps. Surprisingly, a high degree of mortality occurred in untreated checks covered by tarps.

A method to determine viability of golden nematode by electrical stimulation has been under study.

Dimethyl sulfoxide (DSMO), a compound which might enhance the penetrating power of nematocides for control of cyst-forming nematodes was screened and found to be ineffective.

GYPSY MOTH:Radiological Sterilization

Radiological sterilization tests were conducted in large screen cages in an effort to determine whether there were any differences in the ability and propensity to mate, size of egg masses, number of egg masses and survival of progeny.







METHODS IMPROVEMENT (cont'd.)GYPSY MOTH (cont'd.)

Inclement weather at the peak of moth emergence prevented successful completion of these tests. However, there were some encouraging results. When the total egg hatch was compared with the total number of embryonated eggs, a definite reduction of hatch was demonstrated. The results also demonstrated that the dilutions of irradiated males may have to be increased to produce a high degree of control and that factors such as insufficient radiation dosage, unequal competition, and the immigration of males into test plots will have to receive more consideration.

Chemosterilants

The chemosterilants tepa, meta, and hermethylphosphoramidate (HMPA) were applied as contact residual treatments to adult moths. Tepa was also applied to pupae as dips. High mortality resulted in male pupae dipped in 0.5% concentrations for 10 to 30 minutes and at 5.0% for 1, 5, and 10 minutes. HMPA was found to be toxic to both male and female moths. Heavy mortality occurred under minimum treating conditions of one hour exposure to 10 mg/ $\frac{1}{2}$  pint bottle residue.

A limited field test was conducted utilizing male moths exposed to residues of tepa equivalent to 2 mg/ $\frac{1}{2}$  pint bottle (9.5 mg/ft<sup>2</sup>) for eight hours. Results indicated that at this concentration and length of time, male moths can successfully compete with normal male moths under field conditions.

In consideration of the safety aspects of a chemosterilant control program studies were initiated to determine the uptake of C<sup>14</sup> labelled tepa by the adult male gypsy moths upon exposure to residual films. These studies were also made to determine the dissipation of tepa taken up by the moths vs time and metabolic by-products which resulted. A method was developed whereby residues of the chemosterilant tepa as little as 0.5 micrograins/moth can be determined. All data was obtained with moths which had been exposed for a period of eight hours to residual films of 9.5 mg/ft<sup>2</sup>.

Insecticidal Investigations

An evaluation was made of chemicals with favorable insecticidal characteristics as they relate to program needs. Three of the most promising materials in laboratory screening were the compounds SD-8447, Dimethoate, and Dibrom.

These three insecticides were field tested in Connecticut. Dibrom and SD-8447 provided initially high mortality at both one pound and one-half pound per acre. Dibrom in its normal commercially prepared form had a very short residue. The compound SD-8447 had a definite residue activity up to 48 hours. Dimethoate acted much slower; 24 hours elapsed before any mortality appeared.

Follow-up tests with low volume applications of Dibrom and SD-8447 were conducted in Vermont. One pound per acre in double applications of one-half pound each treatment was applied.







METHODS IMPROVEMENT (cont'd.)GYPSY MOTH (cont'd.)

In the laboratory, the weathering capabilities of Sevin 4 flowable was made against the current Sevin 80-UCAR-Rhoplex recommendation. Sevin 80 proved superior with 80% control after three inches of artificial rain, while Sevin 4 flowable showed 20% mortality.

Biological Control

In an attempt to suppress the gypsy moth through biological means, 5,751,750 Ooencyrtus kuwanae, an egg parasite, were reared in Waterbury, Connecticut, and released in New Jersey, New York, and Pennsylvania. Puparia of 44,000 Sturmia scutellata collected in the field suffered high mortality due to unfavorable weather conditions. The 9,742 surviving adult Sturmia scutellata along with 2,813 Calasoma sycophanta were released in areas where they were not known to occur.

In cooperation with the Insect Identification and Parasite Introduction Research Branch and under the auspices of the PL 480 program, 7,480 Tricholyga segregata, 4,350 Apanteles sp. (probably portheidae) and 2,814 Brachymeria intermedia were imported from Spain. Brachymeria intermedia was recovered by a seasonal employee during the 1965 gypsy moth pupae collection program. This is the first evidence of an established colony of this parasite reported in the United States.

There were 101,309 acres included in the first aerial saturation trapping test conducted during July and August 1964. The program included 94,365 acres in New Jersey, 5,664 acres in New York, and 1,280 acres in Pennsylvania. In June 1965 the second aerial saturation trapping test was initiated. Traps were dropped at a 1/16 mile spacing over 46,843 acres in the Watchung Mountain Range and the Mt. Freedom-Mendham, New Jersey, area. Three separate drops were made at 14-21 day intervals in order to span the entire period of male moth activity.

To assist in the evaluation, two one-square mile areas were surveyed in which traps were hand-placed on the ground 1/16 mile apart in one area and 1/32 of a mile apart in the other. Conclusive results relating to control will not be available until the fall of 1965.

Gyplure

To augment reserves of the natural sex attractant for future Division needs, a limited pupal collection was initiated in mid-July. A total of 201,545 pupae was collected in Connecticut and on Cape Cod, Massachusetts. Processed from this collection were 86,500 tips.

In cooperation with the Pesticide Chemicals Research Branch, ARS, the Otis Laboratory bioassayed gypsy moth sex attractant samples which had been purified by PCRB's newly-developed extraction procedure.

Mr. E. O. Stockbridge, PPC District Supervisor, Long Island, field tested the activity of gypsy moth sex attractants in Spain during May and June 1965. Spain was selected for these studies because the life cycle of the gypsy moth is two to three weeks more advanced there than in the infested area







METHODS IMPROVEMENT (cont'd.)GYPSY MOTH (cont'd.)

of the United States. Eight trap lines were established. Attractants tested were natural extract from female moths, synthesized natural material, and gyplure. All showed sufficient attractancy to be considered for use in adult survey and methods improvement control tests later in the summer.

SOIL BIOASSAY:

Of the 759 soil samples tested at the Otis Laboratory this year, 418 were from the Eastern Region, 16 from the Central Region, and 325 from the Southern Region. Twenty-seven special samples were bioassayed for the State of New York.

Micro-organisms in propagation media caused some problem, but this was resolved through the addition of sodium propionate to the surface of the media before introducing *Drosophila* flies.



1. The first part of the document is a list of names and addresses of the members of the committee. The names are listed in alphabetical order, and the addresses are given in full. The list is as follows:

Name	Address
Mr. A. B. C.	123 Main Street, New York, N. Y.
Mr. D. E. F.	456 Broadway, New York, N. Y.
Mr. G. H. I.	789 Fifth Avenue, New York, N. Y.
Mr. J. K. L.	1010 Third Avenue, New York, N. Y.
Mr. M. N. O.	1111 Second Avenue, New York, N. Y.
Mr. P. Q. R.	1212 First Avenue, New York, N. Y.
Mr. S. T. U.	1313 West 125th Street, New York, N. Y.
Mr. V. W. X.	1414 West 100th Street, New York, N. Y.
Mr. Y. Z. A.	1515 West 75th Street, New York, N. Y.
Mr. B. C. D.	1616 West 50th Street, New York, N. Y.
Mr. E. F. G.	1717 West 25th Street, New York, N. Y.
Mr. H. I. J.	1818 West 1st Street, New York, N. Y.

2. The second part of the document is a list of the names and addresses of the members of the committee who have been elected to the office of Chairman. The names are listed in alphabetical order, and the addresses are given in full. The list is as follows:

Name	Address
Mr. A. B. C.	123 Main Street, New York, N. Y.
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Mr. H. I. J.	1818 West 1st Street, New York, N. Y.



PESTICIDE MONITORING

Fiscal Year 1965

Close cooperation was maintained throughout the Region with liaison officers, State Pesticide Boards, and State Pesticide Coordinators. Each was notified of all major control efforts involving the use of pesticides.

In Pennsylvania and Massachusetts cooperative monitoring programs were established in an effort to gain additional information on carbaryl's effect on the total environment when applied by aircraft for gypsy moth control. The following agencies participated:

PENNSYLVANIA

State Department of Health	Water and air pollution
State Game Commission	Effect on wildlife
State Fish Commission	Effect on fish
Penn State University	Effect on aquatic invertebrates

MASSACHUSETTS

State Department of Public Health	Fresh water flora, fauna and water contamination
State Fish and Game Division	Effect on fresh water fish
State Division of Marine Fisheries	Effect on estuarian marine life
State Pesticide Board & ARS	Pesticide persistency on foliage
University of Mass. and ARS	Effect on pollinating insects
Department of Interior - National Park Service	Effect on wildlife and birds

Pesticide use histories were gathered on high use, low use, and nonuse pesticide areas as part of the National Soils Monitoring Program.

Information was gathered for Division use on accidents where agricultural pesticides were suspected to be the causative agent.

Pesticide safety was continually stressed by Eastern Region personnel to farm groups, garden clubs, and youth organizations.







SOYBEAN CYST NEMATODE

Fiscal Year 1965

In the Eastern Region, infestations of soybean cyst nematodes are known to exist only in the State of Virginia. Involved counties include Isle of Wight, Nansemond, Norfolk, Princess Anne, and Southampton. Surveys for delimiting, as well as detection purposes, were conducted in these counties and as a result additional infestations were encountered in all but Nansemond County. A less intensive survey was conducted in thirteen of the northern Virginia counties with negative results. During this year's survey, which included 18 counties, a total of 18,361 samples was collected on 1,516 properties involving 18,435 acres of Virginia crop lands.

In New Jersey, a detection survey was conducted at selected sites in major soybean areas, soil samples being collected in fields where plants showed yellowing or other unusual symptoms. A total of 505 properties with an estimated acreage of 11,406 was surveyed with negative results.

Regulatory measures designed to control movement of farm machinery, equipment and other regulated articles required an increasing amount of attention. Most of the movement was intrastate. The State continued to provide excellent and prompt radio-dispatched cleaning equipment and other regulatory services. Affected growers and processing plants cooperated fully in prevention of spread endeavors.

The area regulated in Virginia under Quarantine No. 79, which operates on a premise and area basis, was extended and added to by a revision of the associated Administrative Instructions, effective July 15, 1964.

Studies and experimental undertakings of assistance were continued by the Virginia Agricultural Experiment Station, Holland, Virginia.

Funds and facilities available for the conduct of this expanding program do not permit fulfillment of initial objectives and pose several difficult problems in connection with continuation of operations.



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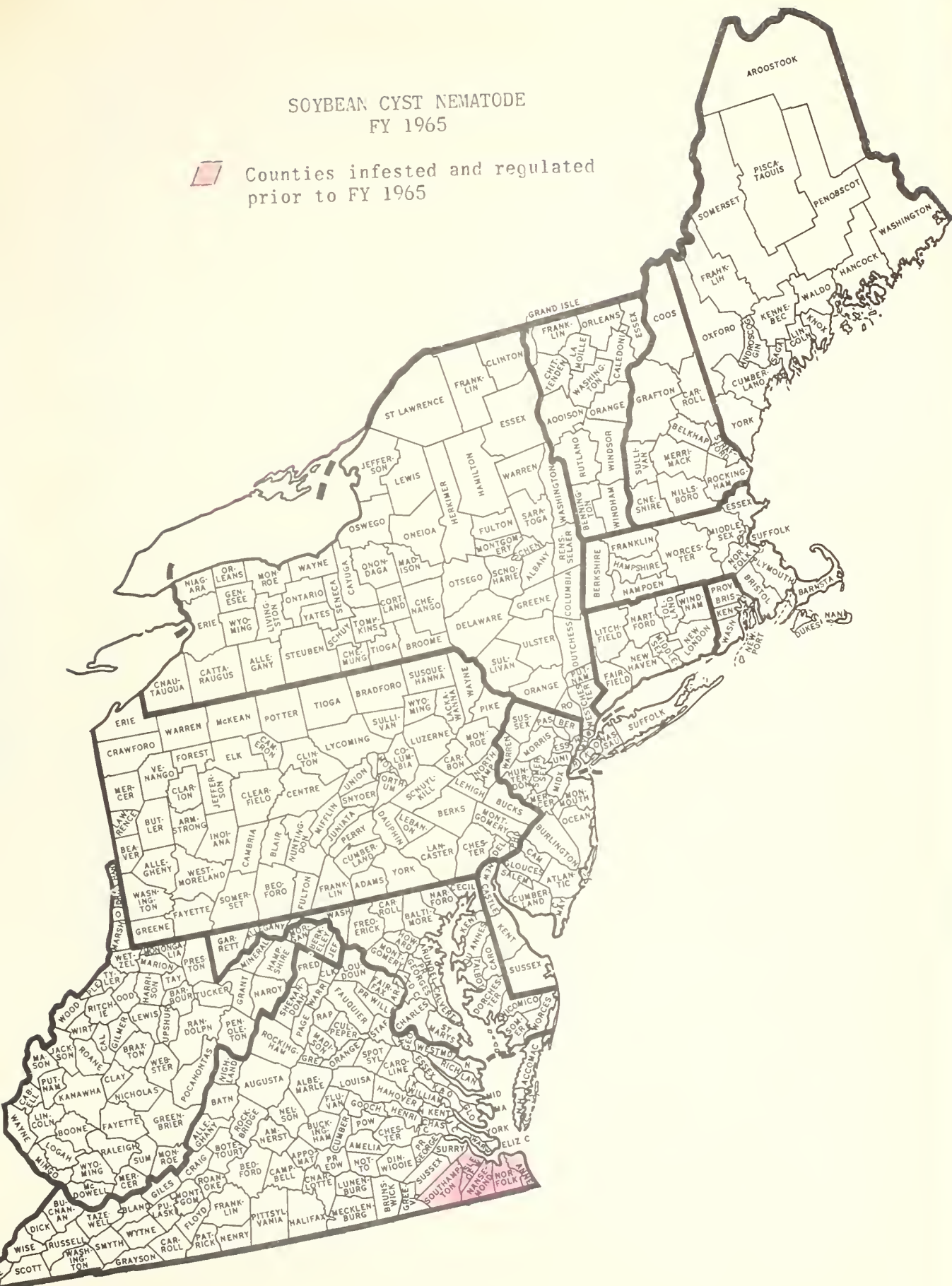
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SOYBEAN CYST NEMATODE  
FY 1965



Counties infested and regulated  
prior to FY 1965









SOYBEAN CYST NEMATODE  
Fiscal Year 1965

State	SURVEY AND DETECTION				REGULATORY		
	Surveyed		Infested		Acres Inspected		Properties Inspected
	Properties	Acres	Properties	Acres	Nursery	Other	
N. J.	505	11406					
Pa.	12						
Va.	1516	18435	38	4515			457
Total	2033	29841	38	4515			457







WHITE-FRINGED BEETLE

Fiscal Year 1965

Surveys for this pest were conducted in New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia and the District of Columbia. Principal emphasis was in Virginia where surveys in 1962 and 1963 resulted in the discovery of infestation in the city of Norfolk and adjacent areas of Virginia Beach. Continued survey in 1964 resulted in the finding of 40 new infested locations in the city of Norfolk and two infested locations in the city of Chesapeake. No additional infestations were found in Virginia Beach. All specimens checked for species and race this season were G. leucoloma imitator and G. leucoloma striatus. The intensive survey was augmented by checking selected sites in Greensville County; the cities of Petersburg and Richmond; and other significant city and rural locations throughout the State. No positive findings were made in the outlying areas. Surveys conducted in states other than Virginia proved negative.

The cooperative control program in Virginia involved treatment of 28 separate blocks in the cities of Norfolk, Chesapeake, and Virginia Beach. A 10% granular dieldrin formulation was applied on 2,149 acres and a 20% granular DDT formulation was used on 660 acres. The treatments were applied by the Virginia State Department of Agriculture, the U. S. Navy, and the U. S. Coast Guard. Ground equipment was used in treating all but 75 acres which the U. S. Navy arranged to have treated by aircraft.

In a revision of Quarantine No. 72, effective September 17, 1964, Virginia was added to the list of states quarantined because of white-fringed beetle.



Excellent cooperation in regulatory activities was extended by the State of Virginia and affected industries.

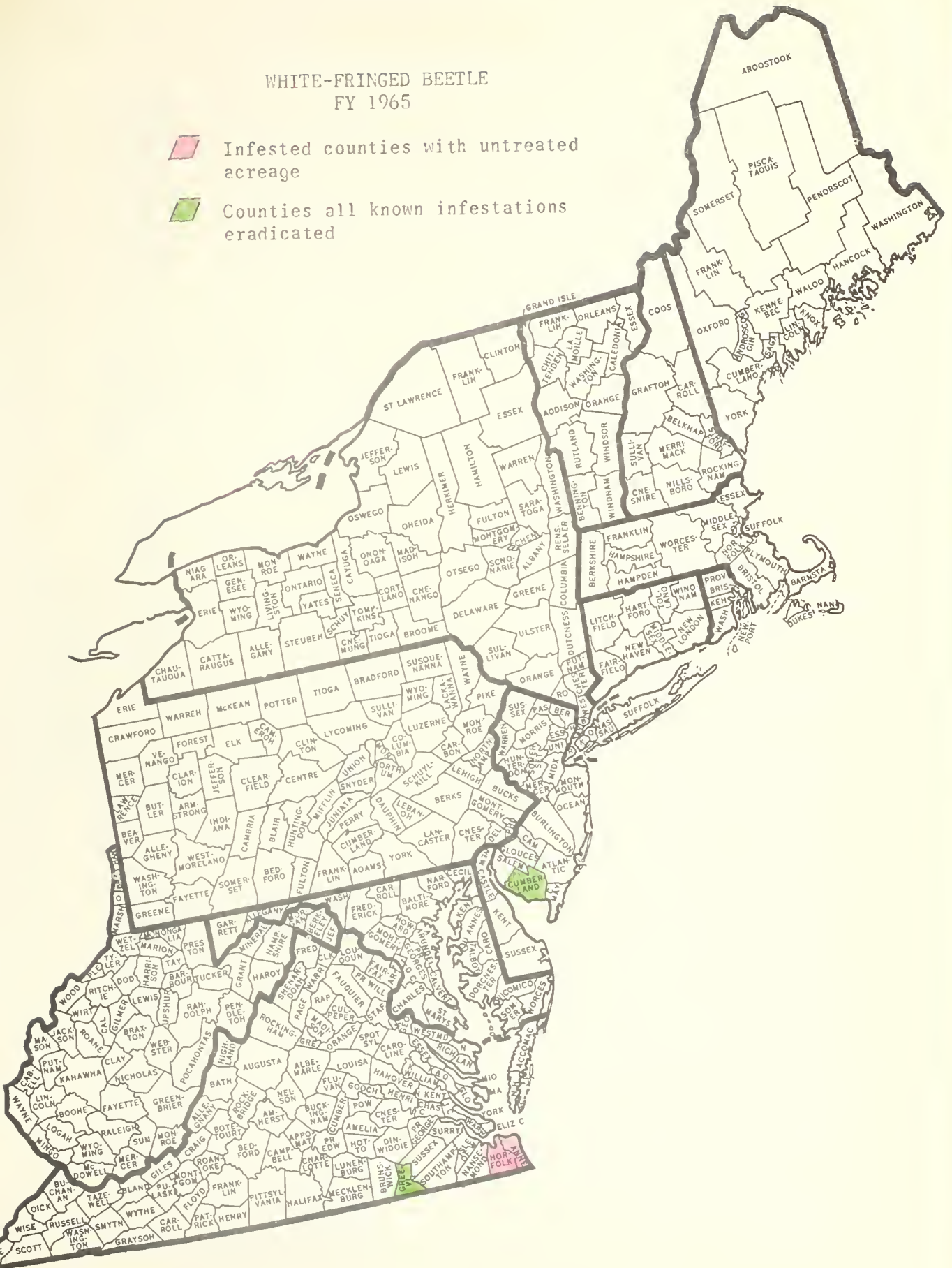






# WHITE-FRINGED BEETLE FY 1965

-  Infested counties with untreated acreage
-  Counties all known infestations eradicated









WHITE-FRINGED BEETLE  
Fiscal Year 1965

State	SURVEY AND DETECTION			CONTROL		REGULATORY					
	Acres		Infested	Acres Treated	Acres Inspected		Properties Inspected		Acres Treated		
	Surveyed	Inspected			Nursery	Other	Inspected	Soil	Foliage		
Del.								1			
Va.		2583		2809	13			379		765	
W. Va.								1			
Total		2583		2809	13			381		765	







WITCHWEED

Fiscal Year 1965

Particular emphasis was given to cooperative survey for witchweed in the southern sectors of Virginia due to proximity to infested areas of North Carolina, as well as traffic between the related areas. It is not uncommon for tobacco transplants to be brought into Virginia from suspect areas for planting adjacent to corn, sorghum, other host crops and host grasses. In the counties most heavily surveyed, all tobacco fields, barn lots and adjacent fields were checked. Similar surveys, on a less intensive basis, were conducted in corn growing areas of Delaware, Maryland, New Jersey, New York, Pennsylvania, and West Virginia. No evidence of infestation was encountered.

Many State and Federal employees assigned to the survey received prior training in survey techniques in the affected area of North Carolina.







## WITCHWEED

Fiscal Year 1965

State	SURVEY AND DETECTION			CONTROL Acres Treated	Properties Inspected	REGULATORY		
	Properties		Nursery			Acres Inspected	Other	
	Surveyed	Infested						
Del.	72							
Md.	238							
N. J.	271							
N. Y.	8							
Pa.	260							
Va.	3529							
W. Va.	105							
Total	4483							















PART IV







MEXICO REGION

PLANT PEST CONTROL DIVISION - A.R.S. - U.S.D.A.

IN COOPERATION WITH

SANIDAD VEGETAL - S. A. G.



ANNUAL REPORT  
FISCAL YEAR 1965







P L A N T   P E S T   C O N T R O L  
C O O P E R A T I V E   P R O G R A M S

M E X I C O   R E G I O N

A N N U A L   R E P O R T

F I S C A L   Y E A R

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United States Department of Agriculture  
Agricultural Research Service  
Plant Pest Control Division







## PLANT PEST CONTROL COOPERATIVE PROGRAMS

In accordance with our Memorandum of Understanding with Mexico, the Plant Pest Control Division of the United States Department of Agriculture and the Sanidad Vegetal of the Mexican Department of Agriculture and Livestock cooperated in the preparation of work plans and the accomplishment of the Boll Weevil, Citrus Blackfly, Insect Detection, Khapra Beetle, Mexican Fruit Fly and Pink Bollworm programs of the Mexico Region.







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## BOLL WEEVIL

Surveys for detection were carried out in northern Chihuahua, northwestern Sonora, and Baja California, which areas are not known to be infested. Results of surveys for detection in the Baja California, northwestern Sonora and Juarez, Chihuahua areas were negative. Surveys for population counts, to determine diapause status, and as a check on effectiveness of treatments carried out, were made in Chihuahua and Sonora. Ground trash inspections were also made in both Chihuahua and north central Sonora for a check on overwintering survival, and hibernation cages were examined periodically in north central Sonora for hibernation studies.

Fall applications of methyl parathion were made of fields in the generally infested Magdalena, Sonora and La Salina, Sonora areas. Likewise, fall applications using low volume concentrate malathion were made of cotton fields along the Rio Grande above the heavily infested Ojinaga, Chihuahua area. The objective of these applications of insecticide was for the suppression or eradication of diapausing weevil to provide a barrier between the generally infested and the boll weevil free areas.

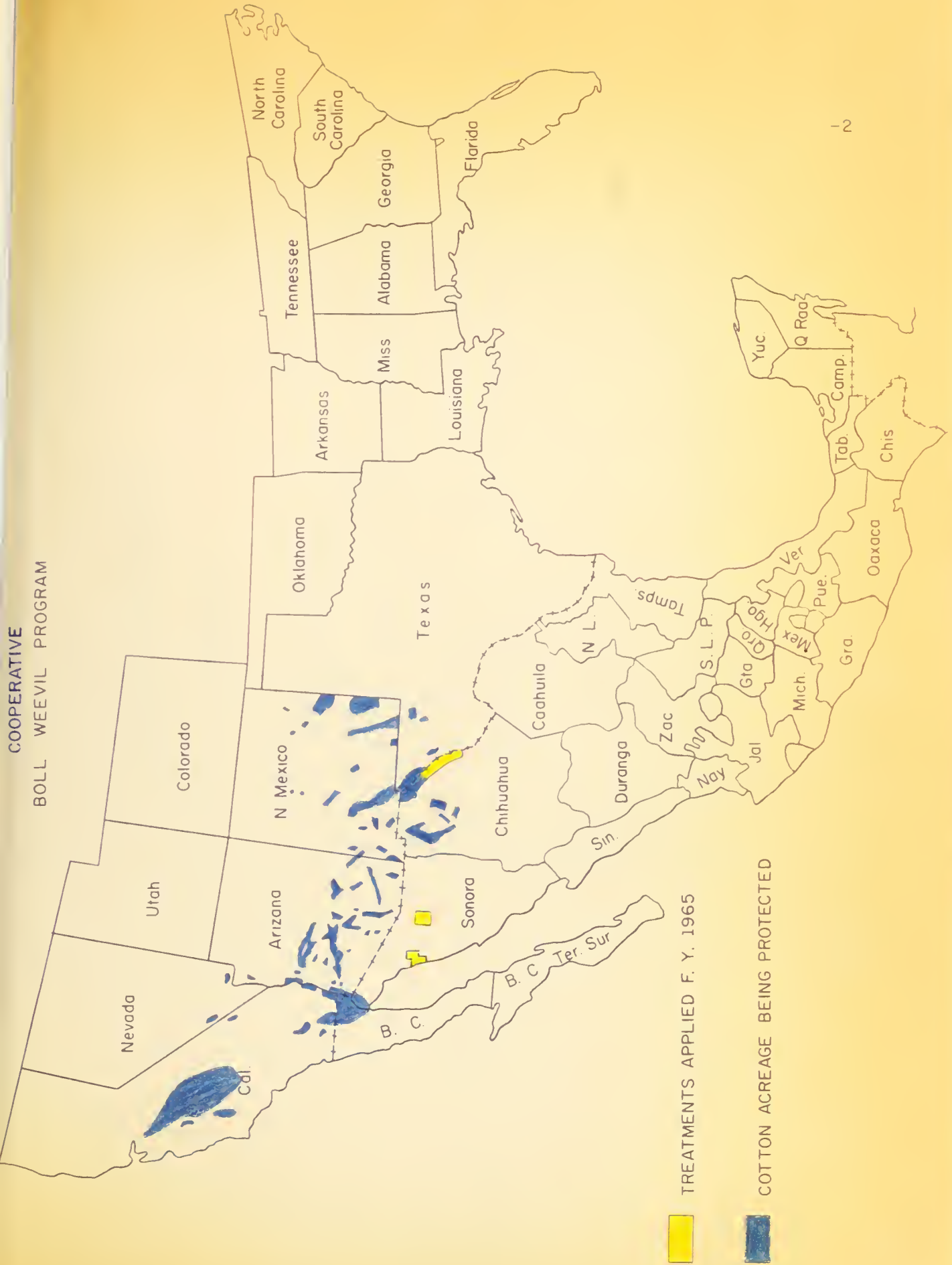
The Chihuahua treatments were coordinated with the treatment of cotton fields across the River in Texas. Surveys this season of the treatment areas indicate that reduction of the boll weevil was obtained.







COOPERATIVE  
BOLL WEEVIL PROGRAM









COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

BOLL WEEVIL

S T A T E	Survey and Detection			Control	
	Surveyed		Infested	Acres Treated	
	Properties	Acres	Properties	Initial	Aggregate
Chihuahua	2,356	52,776	137	1,022	11,781
Sonora	855	57,974	423	2,561	8,855
Baja California	284	18,308	0	0	0
Totals	3,495	129,058	560	3,583	20,636







### CITRUS BLACKFLY - CHEMICAL CONTROL

The States of Baja California, Nuevo Leon, and the northern portions of the States of Sonora and Tamaulipas (see map) are designated as chemical control zones. Surveys for detection were carried on during the year in these areas with 23 infestations of citrus blackfly found in Nuevo Leon, and one in Hermosillo, Sonora. All of the infestations were light.

At the end of the year all infestations of citrus blackfly in Nuevo Leon had been successfully eradicated by spraying with Trithion a total of three times at three week intervals. It was planned to initiate treatment of the Sonora infestation shortly after the start of Fiscal Year 1966.

Regulatory activities included operation of road stations located strategically for the interception and destruction of citrus blackfly host material to prevent its entry into the chemical control zones. Likewise, inspections were made of markets to check for citrus blackfly hosts, and inspections were also made of citrus for certification for movement from Mexico through the United States. A considerable amount of citrus blackfly host material was intercepted and destroyed.

### CITRUS BLACKFLY - BIOLOGICAL CONTROL

The biological control zone lies south of the chemical control zone (see map) and the maintenance of citrus blackfly populations at reduced levels reduces the possibility of infestations in the chemical control zone.

Road stations were operated during the year to intercept and destroy citrus blackfly host material coming from the biological control zone into the chemical control zone. Quantities of citrus blackfly infested leaves were intercepted and destroyed. Regulatory operations also included inspections of citrus, destined for shipment through the United States, in order to find and destroy any citrus leaves in the shipment.

Surveys were made in the biological control zone to determine the degree of parasitization of the citrus blackfly infestations. The surveys revealed areas of need for release of parasites or areas where parasite populations were high and control was good, so that captures of parasites were made and released in more needful areas.

Commercial control of citrus blackfly infestations in the biological control zone was generally good. Some difficulties were experienced in areas where citrus groves were adjacent to cotton plantings. Dusting or spraying for cotton insects resulted in insecticide drift to groves which reduced parasite populations with a consequent increase of citrus blackfly populations.

Prospaltella opulenta, and Amitus hesperidum were the principal parasites involved in the biological control work with P. opulenta being the more widely distributed and the more effective parasite.







CITRUS BLACKFLY  
No. 2, CONT.

Yellow sticky traps were tried both as traps for citrus blackfly in free areas, chemical control zones, and as an aid to control in the biological control zone. There was no indication of its value as an eradication tool against citrus blackfly in the chemical control zone. While captures in the traps of citrus blackfly in the biological control zone were high, evidence as to its value as a control tool was likewise inconclusive. However, further tests on the traps usefulness will be conducted the coming year.







## COOPERATIVE









COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

CITRUS BLACKFLY

S T A T E	Survey and Detection		Control Host Plants Treated	Regulatory I n s p e c t i o n s		
	H o s t s			Packing Sheds	Vehicles	Other
	Examined	Infested				
Sonora	53,870	1	0	82	54,952	0
Baja California	7,701	0	0	0	0	0
Nuevo Leon	830,368	165	102,519	126	262	80,504
Tamaulipas	48,539	0	0	0	0	0
Total	940,478	166	102,519	208	55,214	80,504

Remarks: In the biological control zone in Southern Tamaulipas State 272,949 hosts were examined and 10,816 hosts were found infested but were not reported on PPC 7-30 cards for data processing. 6







COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

CITRUS BLACKFLY  
BIOLOGICAL CONTROL

S T A T E	P A R A S I T E S			L I B E R A T E D	
	<u>Prospaltella</u> <u>opulenta</u>	<u>Amitus</u> <u>hesperidum</u>		Total by State	
Tamaulipas	64,400			64,400	
Veracruz	462,900			462,900	
Morelos	26,000			26,000	
Yucatan & Quintana Roo	920,850	1,685,000		2,605,850	
Guanaajuato	173,100			173,100	
Chiapas	24,000			24,000	
Michoacan	641,850	1,478,000		2,119,850	
Puebla	4,400			4,400	
Sonora	30,000			30,000	
Campeche		1,105,000		1,105,000	
Durango	67,400			67,400	
Tabasco	318,400			318,400	
Totals	2,733,300	4,268,000		7,001,300	







## INSECT DETECTION

Surveys for the detection of Mediterranean fruit fly using Steiner traps were carried out in areas of Mexico vulnerable to the pest. These strategic areas included airports and seaports. Emphasis was given to survey for detection in the State of Chiapas, the gateway to Mexico from Central America, where some countries are known to be infested. Survey results were negative.

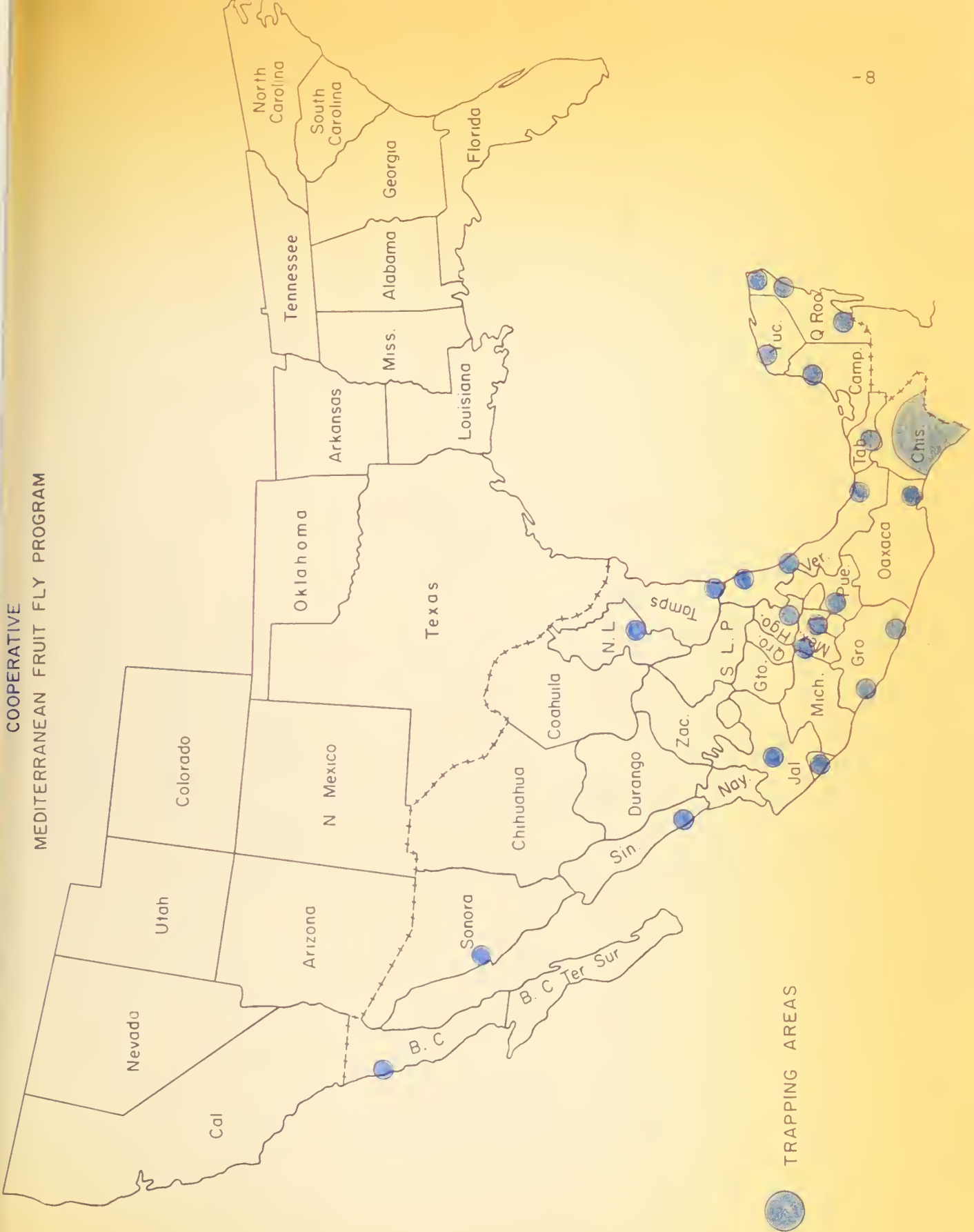
Trapping was also carried out using multiple lure traps in several strategic locations. Survey results for the multiple lure trapping were negative also.







COOPERATIVE  
MEDITERRANEAN FRUIT FLY PROGRAM









COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

MEDITERRANEAN FRUIT FLY

S T A T E	S u r v e y   a n d   D e t e c t i o n		
	Traps Installed	Trap Inspections	Positive Specimens
Baja California	25	588	0
Sonora	138	3,273	0
Sinaloa	37	856	0
Nuevo Leon	35	840	0
Tamaulipas	143	3,583	0
Veracruz	268	6,455	0
Chiapas	1,948	40,551	0
Yucatan	173	4,152	0
Quintana Roo (Terr.)	94	2,256	0
Campeche	68	1,632	0
Tabasco	27	648	0
Oaxaca	34	816	0
Guerrero	107	2,568	0
Federal District	61	3,072	0
Puebla	13	312	0
Mexico	21	504	0
Hidalgo	8	192	0
Colima	12	288	0
Jalisco	25	600	0
Total	3,237	73,186	0







## KHAPRA BEETLE

Surveys for the detection of khapra beetle were carried out in several States of Mexico during the year. Four properties, including a flour mill, were found infested in Tampico, Tamaulipas, and subsequently given eradication treatments. Three khapra beetle infested ships were also fumigated. All other property inspections made were negative. However, a good many inspections of ships coming into Mexican ports were made, and a number of positive specimen collections resulted. Positive collections from ships were found only at ports in the States of Veracruz and Tamaulipas.

A considerable amount of cargo, off loaded at Mexican ports at Veracruz, Veracruz and at Tampico, Tamaulipas from known infested ships was fumigated before being allowed to move to final destination. In those instances where suspicious specimens were found in a ship, the cargo was held for identification of the submitted specimen, unless the broker in the interest of expediency, elected to have the cargo fumigated rather than wait. This procedure has prevented the escape of cargo later determined to be khapra beetle infested, and saved the considerable effort, formerly necessary, of tracing the various items to their final destinations all over Mexico to treat them.

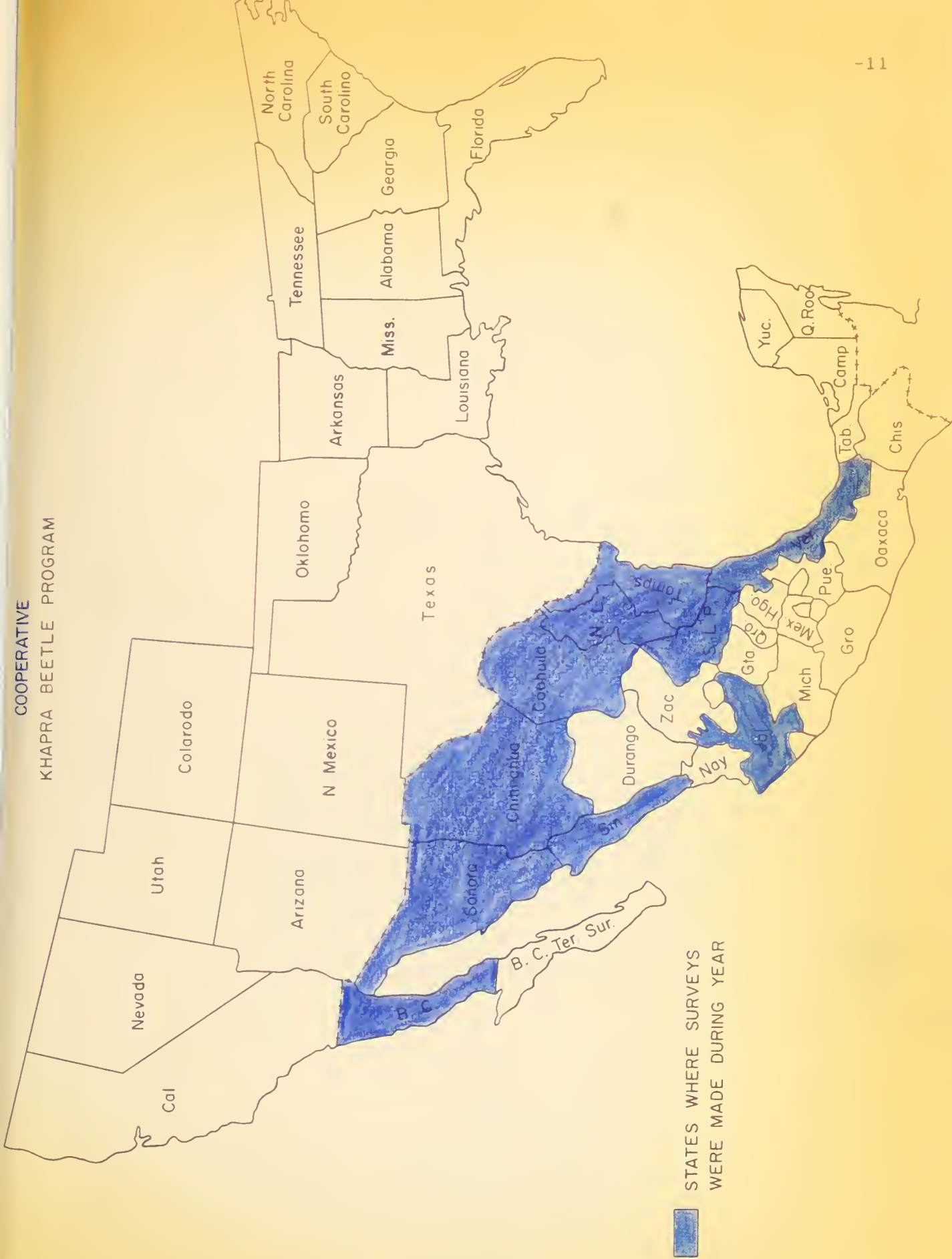
Besides ship inspections, emphasis on survey was given to large distributors in several states in Mexico, in areas with a khapra beetle history of either infestation or exposure.







COOPERATIVE  
KHAPRA BEETLE PROGRAM









COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

KHAPRA BEETLE

S T A T E	Survey and Detection		Control Fumigated Cubic Feet	Regulatory		
	Properties			Properties Inspected	Commodity Lots Treated	Transports Treated
	Surveyed	Positive				
Sonora	134	0	0	0	0	0
Sinaloa	85	0	0	0	0	0
Jalisco	7	0	0	0	0	0
Baja California	133	0	0	0	1	0
Tamaulipas	1,615	4	1,323,872	0	175	0
Nuevo Leon	46	0	0	0	0	1
Coahuila	12	0	0	0	0	0
Chihuahua	7	0	0	0	0	0
Veracruz	347	0	0	0	319	0
San Luis Potosi	4	0	0	0	0	0
Totals	2,390	4	1,323,872	0	495	1



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## MEXICAN FRUIT FLY

While the Mexican fruit fly is not known to be established in Baja California, the area is subject to recurring infestations. Nor is it known to be present in northwestern Sonora. Both of these areas are adjacent and bordering on the citrus producing States of California and Arizona in the United States. These recurring infestations appear to be associated with the mango shipping season and are apparently due to the entrance into the area of limited amounts of contraband host fruits from infested areas further south in Mexico.

Surveys for detection were carried out in northern Baja California and northwest and north central Sonora. These surveys were made using McPhail traps baited with an enzymatic hydrolysate of cotton seed and through the examination of fallen host fruits. Trapping results were positive in Baja California and in Sonora. The examination of fallen fruits gave negative results.

Eradication of the seasonally recurring infestations in Baja California was formerly obtained through the use of malathion spray. Last season eradication was obtained biologically by weekly releases, in overwhelming numbers, of marked, chemically sterilized Mexican fruit flies in areas where trapping had revealed the Mexican fruit fly's presence. Only sterilized male flies were released in Tijuana, Baja California and Tecate, Baja California; however, sterilized male and female flies were released in Ensenada, Baja California. Last season's fly release was terminated November 18. This season's fly releases of sterilized males only was initiated on April 30, and continued on a weekly schedule through June 30. Releases will be continued on the same schedule until trapping establishes that no native flies are present.

Regulatory activities included the operation of quarantine inspections at strategic locations in Baja California and northern Sonora on highways and at airports, railroad stations and seaports. Also inspections were made at Post Offices and fruit markets. Considerable amounts of contraband host materials were intercepted and destroyed.

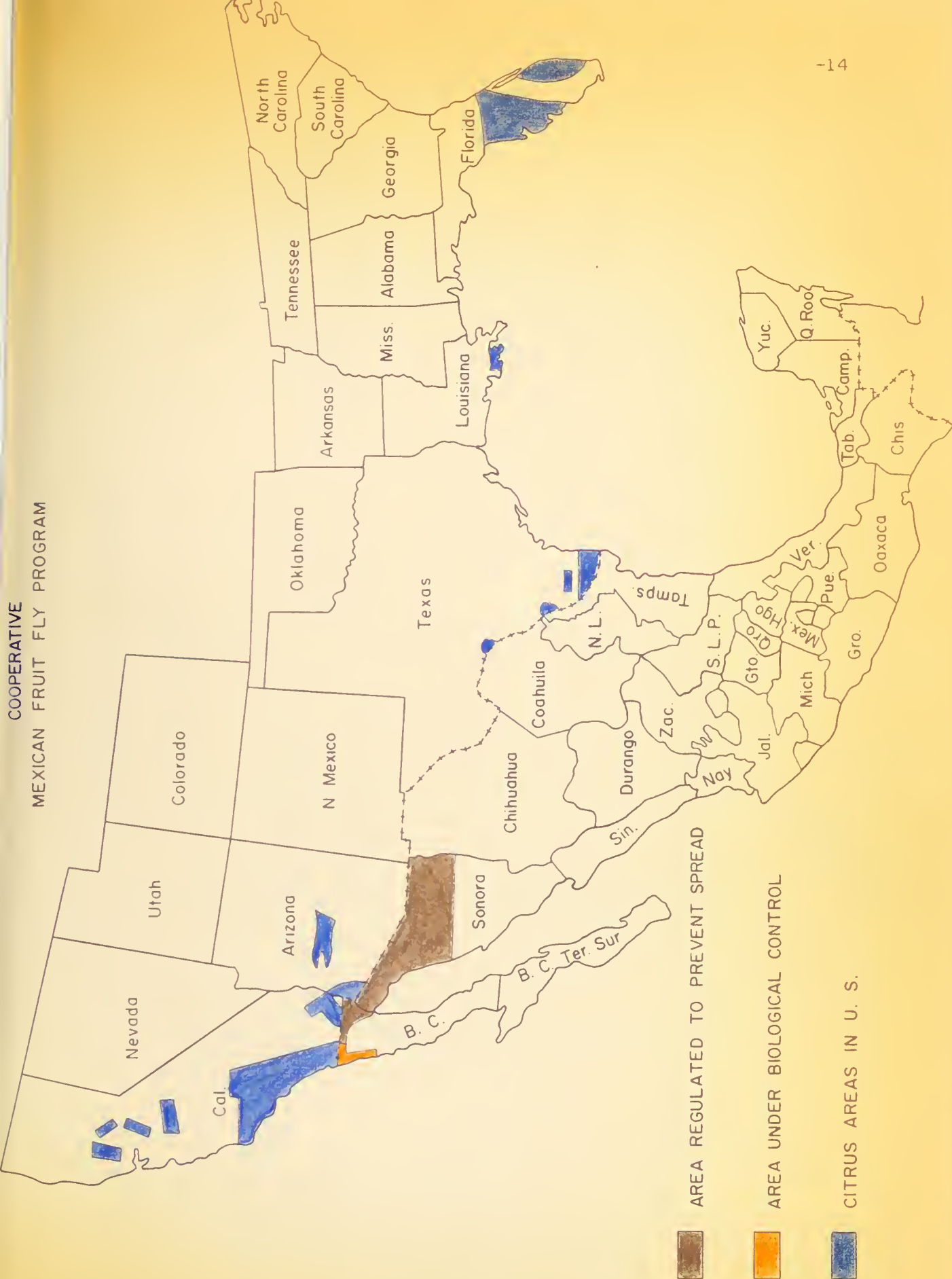
Fumigation chambers were operated at Ensenada, Baja California; Hermosillo, Sonora; and Benjamin Hill, Sonora. Fumigation for certification of all commercial shipments destined for movement into northern Sonora and Baja California was made at these places. Ethylene dibromide was the fumigant used, and a considerable quantity of host fruits was fumigated.







COOPERATIVE  
MEXICAN FRUIT FLY PROGRAM









COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

MEXICAN FRUIT FLY

S T A T E	Survey and Detection			Control		Regulatory		
	Traps Installed	Infested		Chemical Acres Treated	Biological Flies Released Units 1,000	Citrus Acres Trapped	Properties Inspected	
		Properties	Acres				Processing Plants	Other
Sonora	100	2	105	0	0	0	1	0
Baja California	1,440	55	4,280	0	4,753	0	0	0
Total	1,540	57	4,385	0	4,753	0	1	0







## PINK BOLLWORM

Surveys for detection of the pink bollworm in the not known to be infested States of Baja California, Sonora, and Sinaloa were negative. Survey tools used included gin trash machines, and light traps. Visual inspections were also made of blooms and lint cleaners. Limited inspections made in pink bollworm infested East Mexico indicated that with limited exceptions, commercial control was generally good. Inspections were also made in the infested areas as a guide to the farmers for applying insecticides to control pink bollworm.

Control measures included cultural control involving fixed planting and stalk destruction dates in the infested areas. In the pink bollworm free areas the same cultural controls are used as a preventive measure. Insecticide applications were made by the farmers in infested areas to control pink bollworm.

Regulatory activities included the operation of quarantine inspection stations maintained to intercept and destroy pink bollworm host material proceeding from East to West Mexico. Also at these quarantine inspection stations, contaminated trucks and railroad cars were cleaned or fumigated as the situation warranted.

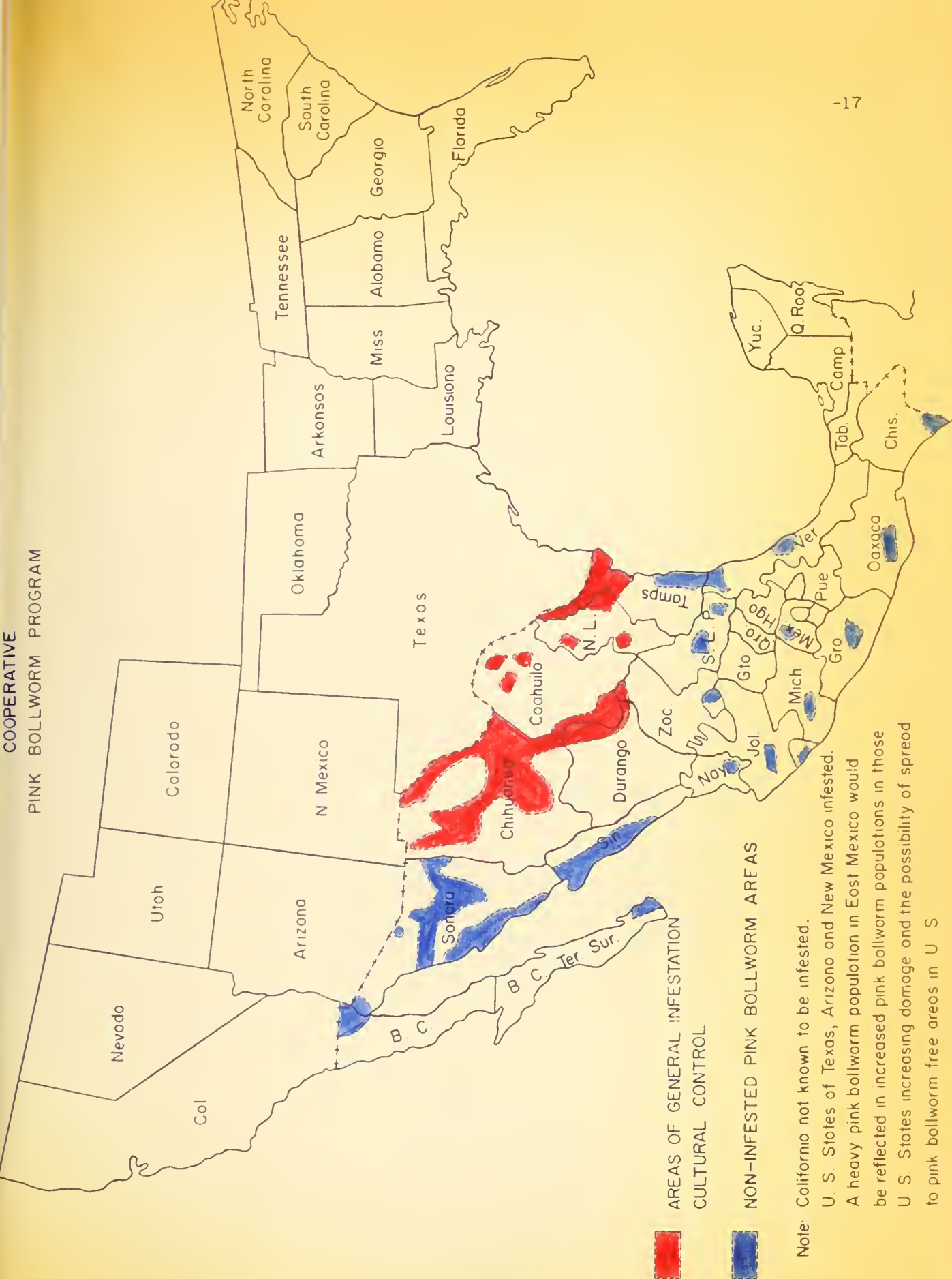
Regulatory visits were made to all processing plants in East Mexico. Satisfactory sanitary conditions were maintained which permitted the certification of the products for entry into the United States for export or inter-state movement.



The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present. The author then goes on to discuss the various factors which have shaped the development of the United States, including the influence of the British, the Spanish, and the French. The author also discusses the role of the American people in the development of the country, and the importance of the American Revolution. The paper concludes by discussing the future of the United States, and the role of the American people in shaping that future.



COOPERATIVE  
PINK BOLLWORM PROGRAM



Note: California not known to be infested.  
 U. S. States of Texas, Arizona and New Mexico infested.  
 A heavy pink bollworm population in East Mexico would be reflected in increased pink bollworm populations in those U. S. States increasing damage and the possibility of spread to pink bollworm free areas in U. S.







COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

PINK BOLLWORM

S T A T E	Survey and Detection					Control Mechanical Acres	Regulatory		
	Surveyed		Infested		Properties Inspected		Industrial	Other	
	Properties	Acres	Properties	Acres					
Sonora	255	32,044	0	0	0	0	0	0	
Sinaloa	181	11,596	0	0	0	0	0	0	
Baja California	34	2,510	0	0	0	0	0	0	
Tamaulipas	1,372	11,678	268	0	257,839	4,719	0	0	
Nuevo Leon	43	0	23	0	4,695	80	0	0	
Coahuila	182	0	179	0	20,685	1,193	0	0	
Chihuahua	140	0	115	0	120,425	561	0	0	
Durango	194	0	194	0	103,500	1,466	0	0	
Veracruz	0	0	0	0	0	16	0	0	
Total	2,401	57,828	779	0	507,144	8,035	0	0	







## QUARANTINE INSPECTIONS

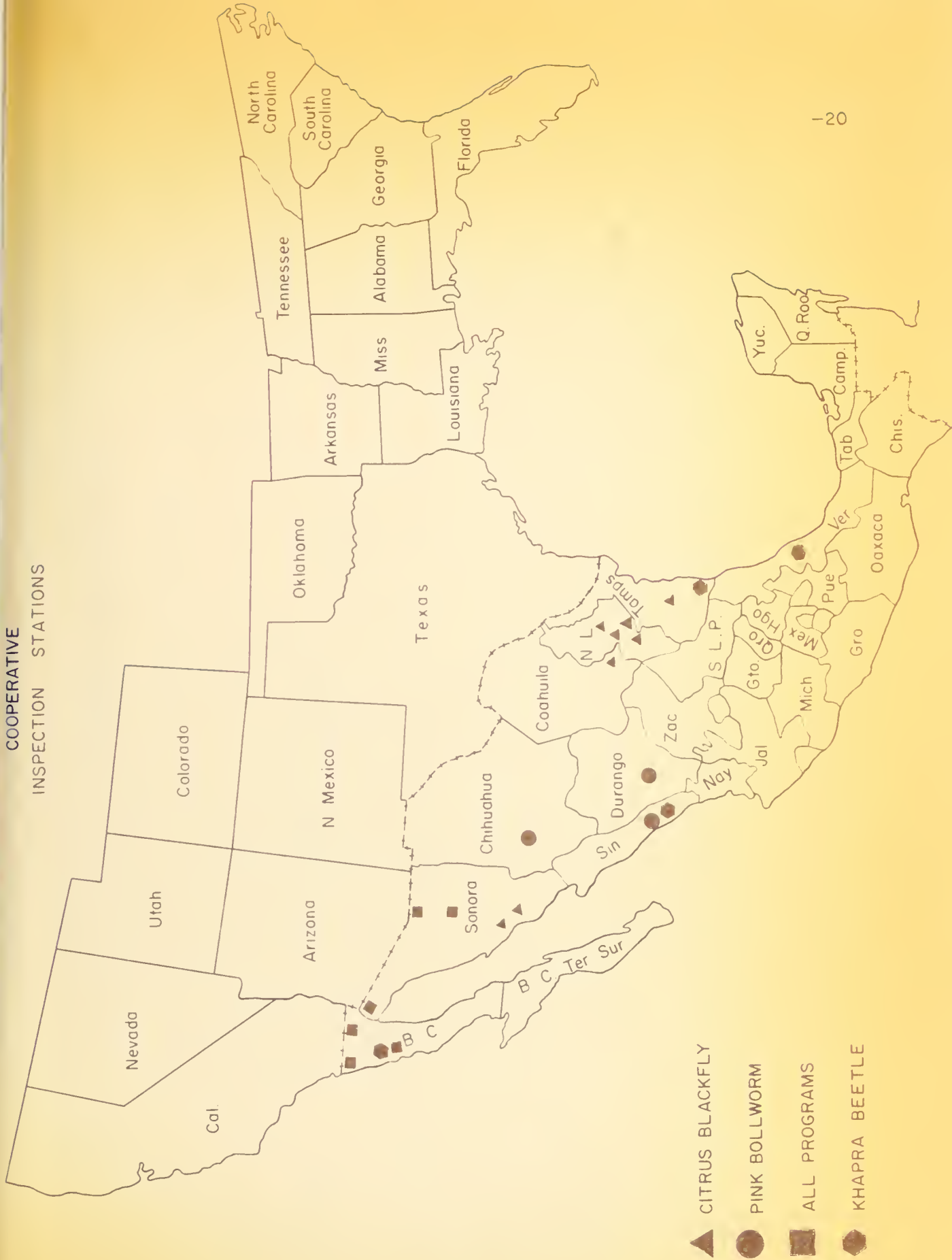
Quarantine inspections were carried out at strategic points. The locations included railroad stations, seaports, highways and airports. Markets and Post Office inspections were also made. The quarantine inspections resulted in the interception and destruction of large quantities of hazardous host material from infested areas in Mexico, destined for non-infested areas in North Mexico bordering on the United States; likewise, railroad cars and trucks contaminated with pink bollworm host material from East Mexico were cleaned or fumigated insuring protection for the pink bollworm free West Coast cotton producing area of Mexico. Large amounts of commercial shipments of Mexican fruit fly hosts were fumigated before being allowed to proceed into Northern Sonora or Baja California.







COOPERATIVE  
INSPECTION STATIONS









COOPERATIVE PLANT PEST CONTROL  
PROGRAMS--FISCAL YEAR 1965

QUARANTINE INSPECTIONS

S T A T E	N U M B E R O F				H O S T S I N T E R C E P T E D		
	Inspections	Passengers and Braceros	Pieces of Baggage and Express	Regulatory Fumigations	Mexican Fruit Fly	Citrus Blackfly	Pink Bollworm
Baja California	13,517	66,136	200,432	1,441	708	108	2
Sonora	286,962	251,240	15,032	200,819	59,054	1,327	8,463
Sinaloa	78,105	60,923					487
Durango	20,527	12,686					625
Chihuahua	1,118						304
Total	400,229	390,985	215,464	202,260	59,762	1,435	9,881















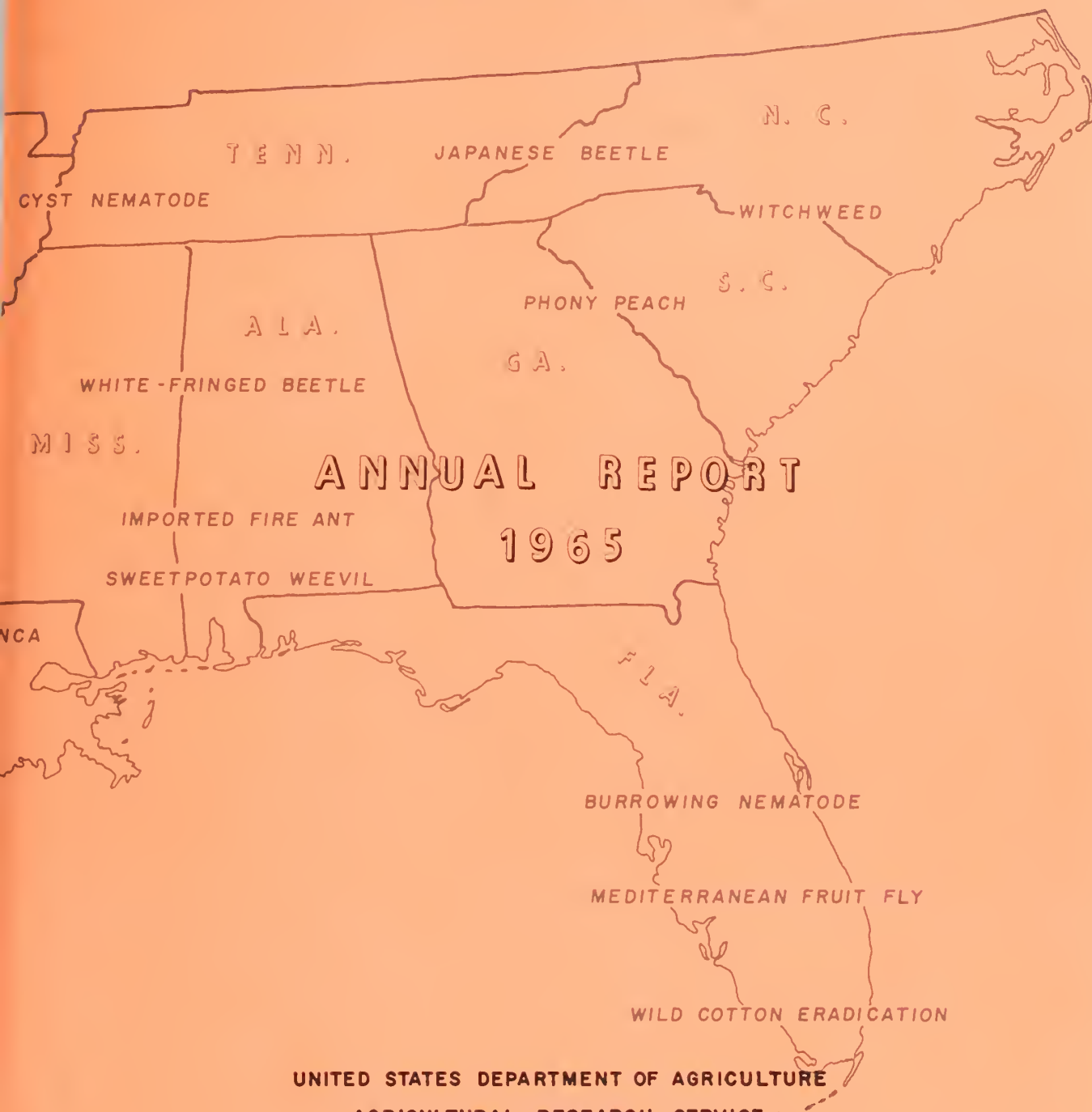
PART V







# PLANT PEST CONTROL PROGRAMS OF THE SOUTHERN REGION



UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE  
PLANT PEST CONTROL DIVISION







UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE  
PLANT PEST CONTROL DIVISION

ANNUAL REPORT  
- 1965 -

SOUTHERN REGION









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#####







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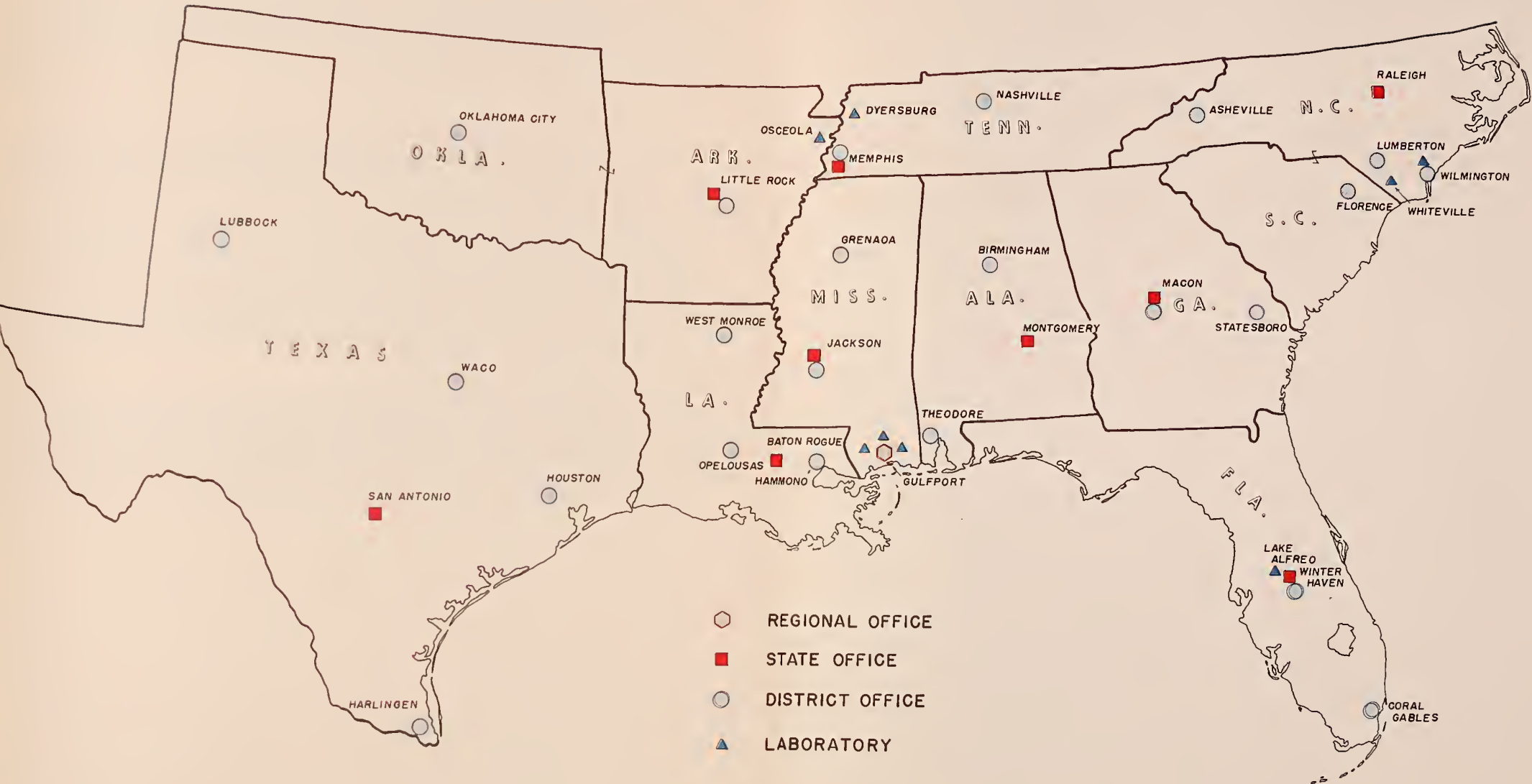








UNITED STATES DEPARTMENT OF AGRICULTURE  
 AGRICULTURAL RESEARCH SERVICE - PLANT PEST CONTROL DIVISION  
 SOUTHERN REGION









## ASSOCIATED ACTIVITIES

Experience indicates that an informed public is usually cooperative, and that PPC can render better service to the public if their confidence, good will, and support can be established. Personnel in the Southern Region therefore continued their efforts to disseminate pertinent PPC information through various media including the press, radio, television, official publications, meetings, farm and home visits, motion pictures, slides, and exhibits.

These activities during fiscal year 1965 consisted of routine and special operations designed to inform the public, especially affected property owners, regarding programs now in effect in the Region. Efforts were made, also, to solicit the cooperation and assistance of landowners in locating and combating established pests and in preventing pest dissemination in noninfested areas.

In several instances, special programs were developed for high school classes at the laboratories and offices throughout the Region. The Louisiana 4-H Club winners visited the PPC facilities at Gulfport again this year, and their directors stated that this was one of the high points of their tour.

Several local and out-of-town science classes, also, were given conducted tours of the Gulfport facilities and indicated especial interest in the identification and chemical laboratories. A number of exhibits were shown at various fairs and other gatherings throughout the Region. At the National Grassland Field Day and Conference, held in Columbia, Tennessee, June 23-25, more than 28,000 people viewed the educational exhibit prepared by PPC personnel.

In the Asheville, North Carolina, District, the PPC supervisor was requested to conduct a class once a week for the benefit of boys from the Carolinas, Florida, and Georgia who attended the Daniel Boone Scout Camp. Six 1-hour illustrated lectures were given. Each meeting was attended by an average of 160 boys, giving a total attendance of approximately 1,000 for the series of classes.



## BARBERRY ERADICATION

The disease of black stem rust in grain is caused by the fungus Puccinia graminis, which passes a part of its life cycle on the leaves of some species of barberry or mahonia plants. Control of the rust is obtained by the destruction of the species of barberry or mahonia plants so affected, thus preventing reinfection of grain fields.

In the Southern Region, no barberry eradication work is done. To assure that no rust susceptible plants are sent into States where an eradication program is in progress, regulatory inspections are made of all nurseries or sales yards from which barberry or mahonia plants are shipped in interstate commerce.

Table 1.--Barberry Eradication

State	Survey and detection			Control	Regulatory		
	Sq. mi. surveyed	Properties reinspected	No. properties found with bushes	Plants destroyed	Inspection		
					No. properties	Nursery acres	Other inspections
Ala.					26	5,656	...
Ark.					2	252	...
Fla.					3	715	...
Ga.					24	1,260	...
La.					16	1,826	1
Miss.					6	455	...
N. C.					6	913	...
Okla.					18	2,512	...
S. C.					4	628	...
Tenn.					34	7,686	12
Texas					12	3,415	1
Total					151	25,318	14



## BOLL WEEVIL

The boll weevil is a native of Central America or Mexico. It was first described by a Swedish entomologist who obtained his specimens from Mexico. The boll weevil was first discovered in the United States in 1892, near Brownsville, Texas. By 1894 it had spread to six counties in south Texas, and by 1922 it was known to infest some 85 percent of the cotton belt. Its movement into the irrigated and plains section of the country was slower, apparently held down by climatic factors. It was first found in the Big Bend section north and west of Presidio in 1953; and although it has been known to occur in the Panhandle of Texas for a number of years, it was not until late in 1962 that it was first observed in the High Plains area. During 1963 in that area, its westward movement was considerable and its damage appreciable. It was at this time that interest in an organized control program for the area began to develop in earnest.

The first organizational meetings were held on a community basis with interested farmers in attendance. Gradually interest spread, and during October 1963 the first full-scale meeting was held at Lubbock. The High Plains Boll Weevil Committee was organized, officers elected, and county committeemen appointed to organize at the county level. Also, the Technical Advisory Committee was named, as well as Finance Committee members. It was during this meeting that the 1964 fall diapause program was born.

The control zone included portions of nine counties; namely, Briscoe, Crosby, Dickens, Floyd, Garza, Hall, Kent, Lubbock, and Motley, and represented an area of approximately 3,516 square miles. The zone was bounded on the south by a line running approximately from Post to Jayton, Texas; thence due north to the Pease River, turning slightly northwest at a point 5 miles northeast of Turkey, Texas; thence southwest to a point approximately 6 miles southeast of Silverton; thence south and following the Caprock with a line averaging 5 miles back from the edge of the Caprock to Slaton, Texas; thence southeast along the Caprock to Post, Texas.

The objective of the High Plains Diapause Boll Weevil Control Program was a reduction in the late weevil populations in order to reduce the number of weevils reaching the diapause stage and going into hibernation.

Funds for the program were made available through two agencies, while personnel and other forms of assistance came from numerous other agencies. Through the efforts of the Plains Cotton Growers, Inc., one million dollars was pledged by cotton farmers of the Texas High Plains, and another million dollars was appropriated by the Congress of the United States for the use of the Plant Pest Control Division, U. S. Department of Agriculture. Organizational and educational meetings throughout the control area were conducted by Texas A&M University; and the signup of farmers was accomplished by the Texas Department of Agriculture, either by mail or by personal contact.

Participation by farmers through completed treatment permits was excellent, as 99.25 percent of the farmers in the control zone signed spray permits.



There were approximately 3,800 farmers within the zone, which contained about 5,000 cotton fields, or a total of 294,845 acres. Only 26 refused to cooperate.

Actual spray operations began September 16, 1964, with 10 spray planes and 3 observation aircraft. The first application was hampered from the beginning by high winds, fog, and rain, but was finally completed on October 6, 1964. During the first treatment, 27,643 gallons of malathion were applied at the rate of 12 ounces per acre to 294,845 acres.

Because of bad weather and unusually high weevil populations, it was decided to increase the dosage of malathion to get higher kills. At the completion of the second application on October 19, 1964, the dosage was increased to 16 ounces per acre by reducing the swath width to 75 feet; and 10 additional spray planes were pressed into service.

Good weather prevailed during the third and fourth applications. With the additional aircraft, the time interval between the second, third, fourth, and in one area the fifth application was shortened to an average of 7 or 8 days, resulting in the completion of the fourth application on November 1, 1964. At the completion of the fourth application, at which time approximately 1,000,000 acres had been treated, the swath width was changed back to 100 feet, but the 16-ounce dosage was maintained by installing additional nozzles on the booms of the spray planes.

Entomologists monitoring the program recommended that the spray application be continued beyond the planned four applications in areas where weevil buildup was still evident. It was determined that the area along the Caprock south and north of Crosbyton, all of Dickens County, and the Kalgary community in Crosby and Garza Counties should receive the fifth application, and the Afton community the sixth application, provided no frost had occurred by the completion of the fifth application.

The final application was completed on November 23, 1964. An aggregate total of 1,136,664 acres had been sprayed.

Field records made during the period of treatment indicated a general population reduction of adult weevils of approximately 90 percent. A comparison of ground trash examinations in 1964 and 1965 bears out these findings and seems to indicate the effectiveness of the program. In 1964 all records showed an average hibernation population of 2,650 weevils per acre. The 1965 examinations showed an average of 281 weevils per acre. These figures indicate 89.4 percent reduction in the numbers in ground trash due to the spray program. If only Dickens County is considered—where infestations were heaviest in both years—the 1964 populations averaged 8,188 weevils per acre, while those in 1965 averaged 734 per acre. These records indicate 91 percent reduction in populations due to the control program.

This year marked the fourth year of the diapause program in the upper Big Bend country and the El Paso Valley, and marked the first year since 1959 that weevils have not been found in the vicinity of El Paso. No weevils were found this year in either El Paso or Culberson County. In the Big Bend section, weevil survey is begun in mid-May and continued into November. Each



year weevils are first found in the lower section of the treatment area and progressively up the river as the season advances; 1964 was no exception.

The insecticide used in 1964 was technical malathion at 10-day intervals at the rate of 10 ounces per acre for the first four applications. However, the mortality was considered insufficient following this treatment. The rate was stepped up to 16 ounces per acre and results were much more satisfactory.

Some 3,000 acres of cotton along the Rio Grande in the United States and Mexico were treated during the year. The work was started on September 17 and completed November 20. Most fields received seven applications, and 18,859 aggregate acres were treated in the Big Bend area of Texas and Mexico. It is believed that this was one of our most successful years.

Table 2.--Boll Weevil

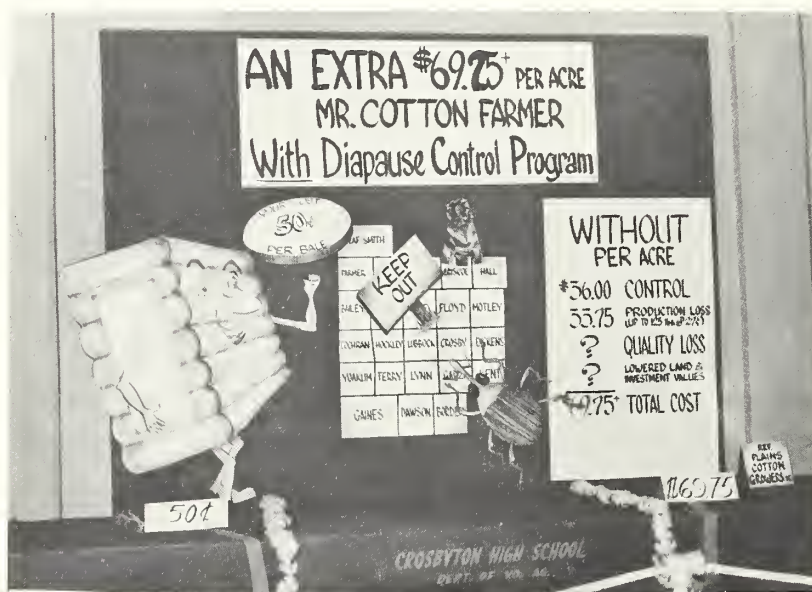
State	Survey and detection				Control	
	Surveyed		Infested		Acres treated	
	Properties	Acres	Properties	Acres	Initial	Aggregate
Texas	2,819		495	28,908	296,227	1,143,742
Total	2,819		495	28,908	296,227	1,143,742



# LISM STUDIES CATTLE



Secretary of Agriculture Freeman, PPC Director Burgess, and ARS Administrator Irving discuss the new low-volume technique for applying spray treatments. This is the technique for which PPC's Methods Improvement section received a Presidential citation and which is credited with saving the Federal agency approximately \$600,000 on the Texas High Plains Boll Weevil Program, with a like savings to the cooperators.



The Plains Cotton Growers Association did much of the educational work on this program.





The emergence cages in the foreground were used at selected locations in the plains area to study the overwintering habits of the boll weevil. Shin oak thickets like the ones in the background provide the most suitable native cover for the overwintering weevils.



Technical malathion was used at the rate of 12 and 16 ounces per acre. More than 123,600 gallons of the insecticide were used to treat approximately 1,136,600 aggregate acres.





During the peak of operations, as many as 20 planes were in use flying from airstrips strategically located throughout the area.



Selected fields were inspected at regular intervals to assure that results obtained were satisfactory.





Both ground crews and aerial observers carefully checked the accuracy of the applications.



Cotton is of prime importance to the plains area. Note trailers in the background loaded with seed cotton ready for the gin. Production in the area is more than two million bales annually. An invasion by the boll weevil could cost a third of this production.









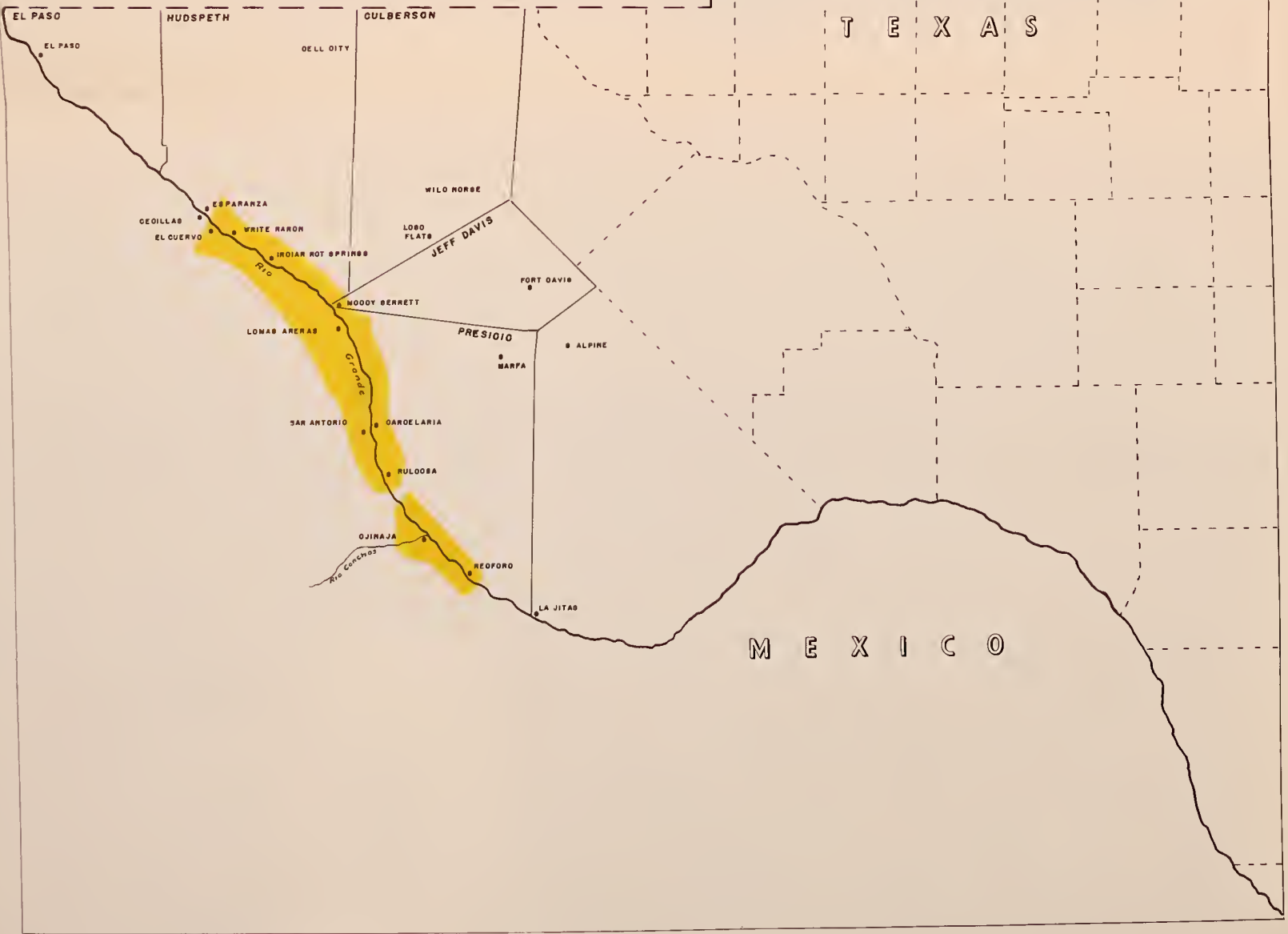
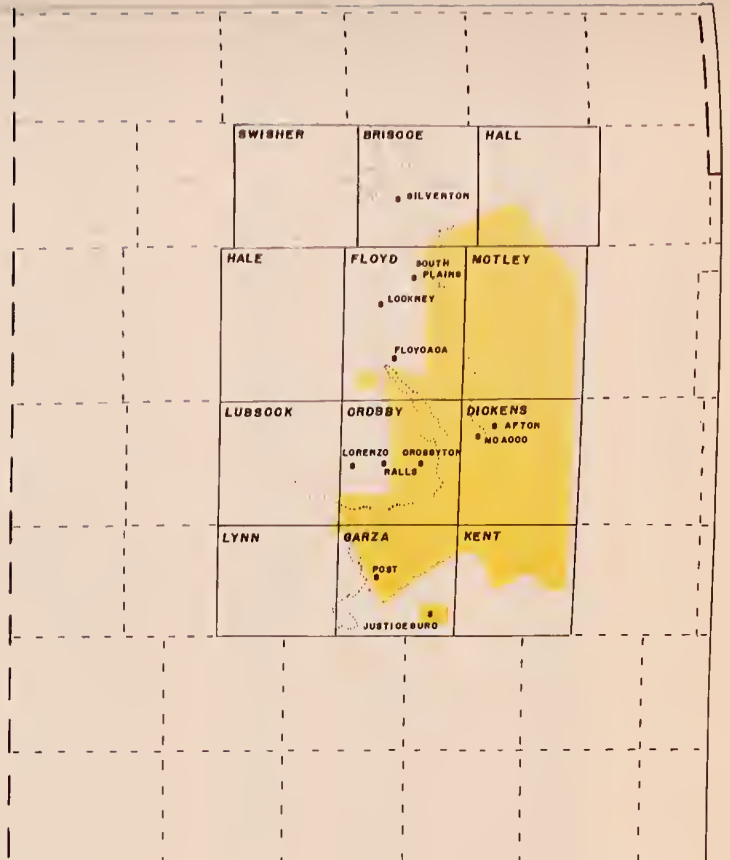






# THE BOLL WEEVIL CONTROL PROGRAM FISCAL YEAR 1965.

TREATMENTS APPLIED F/Y 1965.









## CITRUS BLACKFLY

The proximity of citrus blackfly infestations in Mexico makes it imperative to carry on continuous surveys in the Lower Rio Grande Valley of Texas. In fact, when other work permits, all inspectors in Cameron, Hidalgo, and Starr Counties conduct surveys for this pest of citrus.

Three men were hired in March 1965 to work full time through June on the survey in Hidalgo and Webb Counties. In April, two additional inspectors were hired and added to the crew. The Texas Department of Agriculture furnished several employees from time to time to supplement the inspection force.

Five PPC employees went to Victoria, Mexico, on a three-day training trip in March 1965. This afforded them an opportunity to see the citrus blackfly in all stages of development, as well as to observe the parasite Prospaltella opulenta.

In conducting the program for fiscal year 1965, special attention was given to inspecting locations in Laredo, Webb County, and Brownsville, Cameron County, which were found infested in 1955. Also, a thorough survey was made of Weslaco, Hidalgo County, which was found infested in 1956. A close inspection was made of the Monte Alto area in Hidalgo County, where a large volume of Mexican citrus was taken for processing. Inspections were made along the main highways crossing the Lower Rio Grande Valley, and the usual survey of commercial groves was continued.

Inspectors in south Florida continued to be alert for the citrus blackfly while checking fruit fly traps and making other inspections.

No specimens were found at any location.

Table 3 .--Citrus Blackfly

State	Survey and detection		Control	Regulatory		
	Hosts		Host plants treated	Inspections		
	Examined	Infested		Packing sheds	Vehicles	Other
Texas	83,052					
Total	83,052					



## MEDITERRANEAN FRUIT FLY

It was encouraging that no Mediterranean fruit flies were trapped in Florida the past year, especially as flies were recovered during the three previous years.

The greatest difficulty encountered during the year resulted from three hurricanes that battered the State of Florida. These hurricanes took their toll in trap destruction. The loss of traps ranged from 15 to 20 percent totally destroyed to as many as 75 percent knocked to the ground. This loss was restricted to the impact areas, of course; and when the cost of pulling and replacing all traps is considered, it is more economical to leave the traps in the field. Further, there is often not time to pull the traps in an orderly manner.

Arrangements were made for a Navy warrant officer to trap for fruit flies on Guantanamo Base. Fortunately, this survey was negative.

The Mediterranean fruit fly trapping program is a cooperative one between the Division of Plant Industry of the Florida Department of Agriculture and the Plant Pest Control Division.

Lure traps were operated in the principal citrus-growing area of Louisiana (Jefferson and Plaquemines Parishes) and in the port area of Gulfport, Harrison County, Mississippi, with negative results.



## MEXICAN FRUIT FLY

As in past years, the Mexican fruit fly crossed the border in fiscal year 1965 and infested the grapefruit groves of the Valley of Texas. The survey and regulatory program that has proved satisfactory in preventing its spread to other citrus-growing areas during the past several years was again conducted during 1965.

The McPhail trap with the enzyme hydrolyzed cottonseed protein lure was used in the detection program. The first fly of the season was found near La Feria, Cameron County, on November 25, 1964. During the season 77 adult flies were caught, as compared to 157 last year. Larval infestations, however, increased from 5 last year to 16 this year. The first larva was found February 26, 1965, in a grapefruit grove west of Harlingen. The 1964-65 citrus season began September 23, at which time the maximum number of 2,100 traps was in use. Traps were reduced by one-half in December, and all traps were removed by April 16, 1965.

Regulatory activities increased again this year as Texas citrus grew back from the 1962 freeze. The 1964-65 crop of Texas citrus amounted to 1,820,243 boxes, which is about three times the previous year's crop. By April 15, all commercial citrus had been harvested. Mexican citrus continued to be imported in large volume.

There were 103,837 boxes of citrus of various sizes fumigated for movement to California, Arizona, and the Southern States.

Beginning April 1, certification was discontinued on Mexican citrus when it is still in the original container showing the name and location of the packing plant. This change will decrease the workload of certification somewhat, but the increasing production of citrus in Texas is expected to offset it, and an increase is expected in the overall workload.

Table 4.--Mexican Fruit Fly

State	Survey and detection			Control		Regulatory		
	Traps installed <sup>1/</sup>	Infested		Chemical	Biological	Citrus acres trapped	Properties inspected <sup>2/</sup>	
		Properties	Acres	Acres treated	Flies released (units 1,000)		Processing plants	Other
Florida	487	...	...			...	...	...
Texas	1,200	40	608			2,232	1,681	122
Total	1,687	40	608			2,232	1,681	122

<sup>1/</sup> Number locations trapped, January 1 - June 30, 1965.

<sup>2/</sup> These figures represent "visits."









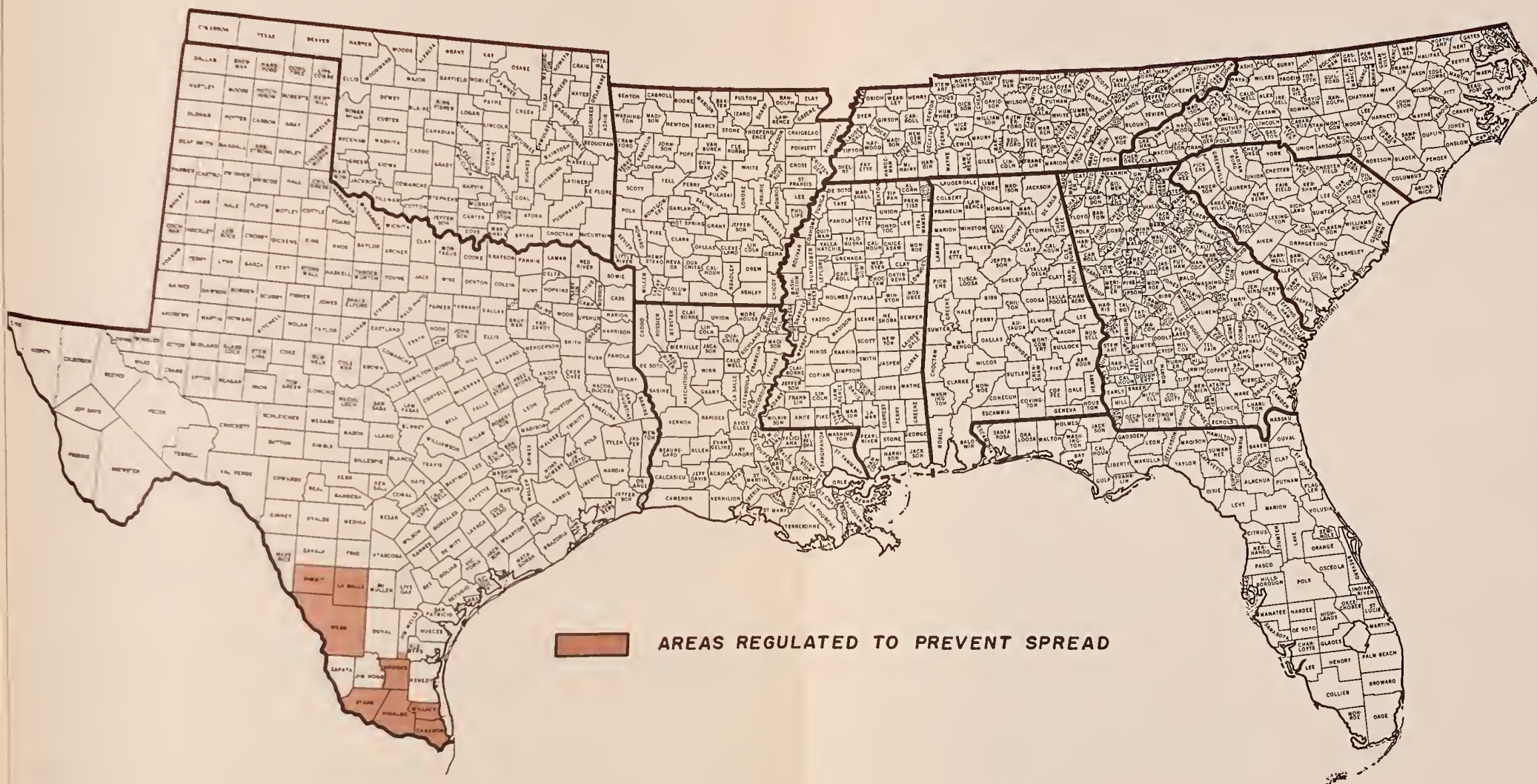






UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE - PLANT PEST CONTROL DIVISION  
SOUTHERN REGION

MEXICAN FRUIT FLY









## COOPERATIVE ECONOMIC INSECT SURVEY AND DETECTION

This program was continued this year under the cooperatively financed concept with full-time survey entomologists in Alabama, Arkansas, Florida, Georgia, North Carolina, Oklahoma, and Texas. In addition to the above, the State of Mississippi consummated a modified agreement prior to the close of the fiscal year. For the most part, excellent reports of insect occurrence and abundance were received from all States under agreement and, in many cases, equally valuable reports were furnished by States not operating under cooperative agreement. At the beginning of the fiscal year, Mr. Sidney Kunz, Stillwater, Oklahoma, was succeeded by Mr. Donald C. Arnold as survey entomologist for the State of Oklahoma. At the close of the fiscal year, the cooperative agreement in effect with the Georgia State Department of Agriculture was terminated, and Mr. W. C. Johnson, the survey entomologist, accepted a position with the Extension Service in Tennessee. Annual summaries of insect conditions were received from all States under cooperative agreement, and loss estimates were submitted by the States of Arkansas and Oklahoma.

There were 4,310 insect collections submitted to the Taxonomic Section at Gulfport from all States in the Region as a result of survey work. For the most part, these were program pests and all collections were identified by the close of the fiscal year.

Some visual survey incidental to other work was made in the Region for corn stunt disease. In Louisiana, a considerable amount of corn was observed which indicated the possible presence of this disease. Several insect specimens were collected and submitted for determination, but none was identified as the known vector of the corn stunt disease. However, Dr. L. D. Newsom, Head of the LSU Entomology Division, reported the collection of the vector of this disease in several of the parishes.

A limited amount of survey for tolyposporium smut was conducted in pearl millet plantings of the Lower Rio Grande Valley and the Lubbock areas of Texas. All surveys were negative.

A new cyst nematode, an undescribed species of Heterodera, was found infesting St. Augustine grass in Dade, Broward, and Palm Beach Counties, Florida. This pest has demonstrated economic importance, and has influenced the State's sod certification program.

One specimen of the sugarcane root stalk borer weevil, Diaprepes abbreviatus, was recovered from a nursery September 29, 1964, in Apopka, Orange County, Florida. Intensive survey of the premises was negative for any additional specimens.

### Beet Leafhopper and Potato Psyllid (Texas and New Mexico 1965)

Each year a survey of the western and southwestern portions of Texas and the southern and southeastern portions of New Mexico is made to determine the beet leafhopper and potato psyllid populations, as well as the condition and distribution of their host plants. The 1965 surveys for Texas and New Mexico were combined, the same team surveying both States.



The survey began February 24 and was completed April 7. Lycium in all sampling areas was extremely late leafing out, delaying the completion of the potato psyllid survey. The local U. S. Weather Station stated that March 1965 was the coldest experienced in 50 years, causing the delay in leafing out of this host plant. This condition has been noted the past two seasons and consideration will be given to splitting the survey next year.

In Texas, the beet leafhopper population counts were about the same as last year, averaging 11 per hundred square feet, but the host plants were more lush, abundant, and widespread. This year 86 percent of the sites contained host plants while last year 66 percent contained host plants.

In New Mexico, the beet leafhopper population counts were lower this year, even though host plants were more abundant. Populations this year averaged 14 per hundred square feet as compared to 32 per hundred square feet last year, and 74 percent of the sites contained host plants as compared to 40 percent last year.

Potato psyllid population counts were lower this year in all sampling areas except the El Paso and Sanderson, Texas, sections.

#### A Fruit Fly (Florida)

Late in April 1965, the larva of a fruit fly, Anastrepha suspensa, was discovered at a residence in Miami Springs, Dade County, Florida, infesting Surinam-cherry. Four days later, two adult flies were caught in McPhail traps. During May, there was a steady buildup of fly populations and a gradual expansion of infested properties extending out from the original find, which was considered to be near the focal point of introduction. By the middle of June, the infestation had reached explosive proportions. Shortly thereafter, a meeting to determine what action should be taken in regard to this infestation was held in Miami with personnel of the Entomology Research and Plant Pest Control Divisions, USDA, and the Division of Plant Industry, Florida Department of Agriculture. By this date, a single trap had caught almost 300 flies in less than a week. The host list also had expanded, but guava was the only crop economically affected.

The chief concern at the close of the fiscal year centered around the possibility that this insect might be a slightly different race of Anastrepha than the A. suspensa previously recorded in Florida. A different race would preclude the possibility of reliably forecasting the economic hazard involved. A public hearing to determine the threat to the Florida citrus industry and the course to follow to adequately meet this threat was scheduled for early in July at Lakeland, Florida.



## Cereal Leaf Beetle

Surveys for cereal leaf beetle were conducted in most of the States of the Southern Region with negative results. The major portion of the work was done in the grain-producing areas of Texas and Oklahoma, and at the most likely points of introduction in other areas. Emphasis was given to race-tracks, sales barns, and hosts adjacent to highways and railroads leading out of infested States and near concentration points for grain products. Much of the work was done in conjunction with other surveys.

Table 5.--Cereal Leaf Beetle

State	Survey and detection		Control	Regulatory			
	Surveyed No. stops	Infested acres		Acres treated	Properties inspected	Commodity treatments	
						Hay, straw (tons)	Small grains (bu.)
Arkansas	217						
Florida	170						
Louisiana	139						
North Carolina	1,040						
Oklahoma	126						
South Carolina	435						
Tennessee	495						
Texas	2,196						
Total	4,818						

## Cuban May Beetle

Surveys for Cuban May beetle were limited to Dade County, Florida, and one light trap at an airport in Louisiana having numerous flights from Miami, Florida. Incidental surveys were made in connection with other program pests. Some economic damage was reported in Florida and some trees were defoliated by the beetle. The host list for this insect continues to mount as the population increases. In addition to their work on the biology of this pest, entomologists at the Experiment Station in south Florida are continuing to make tests of various insecticides for its control.



### European Chafer

Black light traps were operated in Shelby County, Tennessee, and traps set at various locations by the University of Tennessee were serviced and inspected by PPC inspectors. No specimens of European chafer or other injurious insects of primary importance were taken.

Limited surveys in connection with other activities were conducted in Florida and North Carolina with negative results.

### Golden Nematode

During fiscal year 1965, golden nematode survey in the Southern Region was limited to the collection of soil samples in areas of commercial potato production in Escambia County, Alabama. Results of this survey were negative.

### Gypsy Moth

During the year, a limited amount of gypsy moth survey was conducted in the hardwood areas of Alabama, Arkansas, Georgia, Mississippi, North Carolina, and Oklahoma. In addition to this routine survey, follow-up inspections were made in connection with trailers, automobiles, tents, and other camping equipment destined for locations in the Southern Region after being parked in infested campsites in the Eastern Region. This work was incidental to regular duties, and all inspections for gypsy moth were negative.

### Hoja Blanca

Surveys for the symptoms of the disease and presence of the vector Sogatia orizicola were made in the principal rice-growing areas of Arkansas, Louisiana, Mississippi, and Texas, with negative results. The vector has not been found in Louisiana since 1963.

A single male Sogatia orizicola was found in a 47-acre ricefield in Hendry County, Florida, on September 17, 1964. Rice has been planted for two years in the county but this is the first time it has been found infested. Surveys were negative in the vicinity of Belle Glade, Palm Beach County, where infestations were found in previous years. No controls were applied in Hendry County.



Table 6.--Hoja Blanca

State	Survey and detection				Control	
	Surveyed		Found infested		Insecticide	
	Properties	Acres	Properties	Acres	Treated by air	
					Properties	Acres
Arkansas	39	3,220	...	...		
Florida	19	2,007	1	47		
Louisiana	777	75,781	...	...		
Mississippi	4	662	...	...		
Texas	181	16,821	...	...		
Total	1,020	98,491	1	47		

### Oriental Fruit Fly

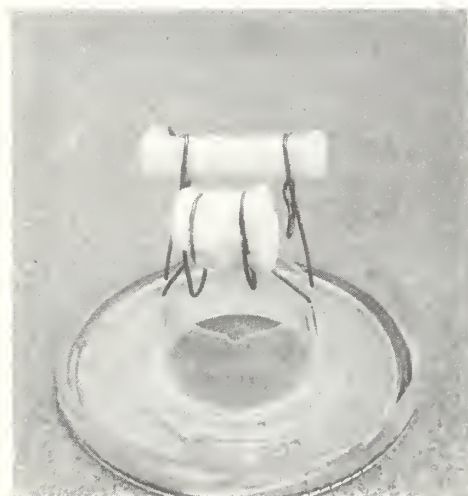
A male oriental fruit fly was found in St. Petersburg, Pinellas County, Florida, in a routine trap inspection on October 15, 1964. The trap was baited with trimedlure on one wick and cue-lure/methyl eugenol with one percent dibrom on the other. The trap was located in a calamondin tree at a residence, 3829 Second Avenue, North, which is close to downtown St. Petersburg.

Following identification by entomologists in Gainesville (subsequently confirmed by Dr. Foote, USDA), the Plant Pest Control Division and the Florida Division of Plant Industry took immediate steps to increase trapping in the area, sharing costs on a 50/50 basis. The number of traps in Pinellas County was increased from 605 to approximately 5,400. Traps were increased, also, in the neighboring counties of Hillsborough and Manatee. Only one lure (methyl eugenol) was used in the additional traps. Trapping personnel were increased by 32 during the most intensive inspection period.

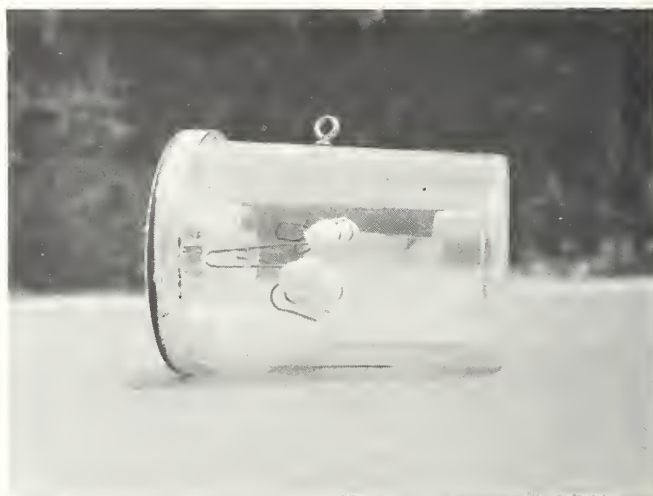
The increased trapping was continued until the last week in January, a total period of approximately 14 weeks. Following the initial find, all trapping was negative, indicating that an infestation was not established. Investigations were made into possible means of entry but the actual carrier was not determined.



Properly located, the Steiner trap is a very efficient and selective survey tool for Mediterranean, Natal, melon, Queensland, and oriental fruit flies. The 3/8 x 2" cotton dental roll baited with trimedlure attracts the Mediterranean and Natal fruit flies. The 3/4 x 1" cotton dental roll baited with a mixture of 2 parts cue-lure and 3 parts methyl eugenol (with 1% dibrom) attracts the Queensland, melon, and oriental fruit flies. Approximately 5 ml. of each lure is used for initial baiting. Traps should be inspected and rebaited at 1- to 3-week intervals, depending on purpose of survey. Traps are located at points where flies are most likely to be introduced for detection surveys, and densities range from 16 to 50 per square mile for general and delimiting surveys.



Steiner trap showing mounting of 3/8 x 2" and 3/4 x 1" cotton dental rolls.



Complete trap showing proper position of dental rolls approximately equidistant from each entrance.



Placing trap in tree by use of stick with wire hook out of reach of children.



Trap properly set in tree showing label inscribed "Government Property--Poison."



## DETERMINATION OF IMPACT OF AGRICULTURAL PESTICIDES ON FARMLAND

The DIAP Program began in May 1964 and was in full operation at the beginning of fiscal year 1965. Five pairs of study areas, each comprising two 640-acre sites, were selected, three in Mississippi and two in Arkansas. From these areas, samples of soil, water, sediment, crops, and land and aquatic animals were collected periodically and submitted to the Gulfport Chemical Analytical Laboratory to determine whether pesticide residues were present. Selected groups of insects, also, were studied to determine population fluctuations.

Sampling of most of the above-mentioned media was terminated in October 1964, at the end of the crop-growing and pesticide-treatment season. However, soil samples were collected from all locations through January 1965, and water and sediment sampling continued through the winter months. There were 3,780 samples collected for chemical analysis during the first season's work; and as of July 1965, analysis was complete on all but a few of these samples. Approximately 450 samples were discarded (not analyzed) for various reasons; i.e., sample too small, broken, damaged, or classified as insignificant for purposes of this study.

In March 1965, a review of the study areas indicated that changes were desirable. As a result, one entire study area in Mississippi and one in Arkansas, as well as one site in each of the remaining study areas, were closed. One area was added in Alabama, and a highly modified sampling operation was begun, providing for:

1. The sampling of soil every six months, on a pretreatment and posttreatment basis,
2. The sampling of insects and soil-inhabiting organisms biweekly,
3. More intensive sampling of water from ponds in watersheds located strictly within the study areas,
4. Restriction of aquatic life samples to collections from the above-described ponds,
5. Sampling of wildlife, both before and following the pesticide-treatment season, and
6. Sampling of crops to determine the presence or absence of pesticides in the plants, seeds, tubers, or fruit.

By the first of July, 1,879 samples had been collected in the 1965 program. Because of the priority given the 1964 samples, analytical work was just getting under way at the end of the fiscal year on the 1965 samples.

Since the opening of study areas in other regions, and prior to July 1, approximately 228 samples from the Western Region and approximately 50 from the Central Region had been received in the Gulfport Laboratory.

Near the close of fiscal year 1965, special soil studies in areas of high pesticide use were started in Texas on cotton and vegetable lands and in Florida on vegetable lands. Soil sampling was completed on the Texas sites and additional special study areas were being sought in North Carolina, South Carolina, and Georgia.



## GRASSHOPPER

Grasshopper adult surveys were conducted in the Panhandle areas of Texas and Oklahoma, in southern and western Oklahoma, and in western Arkansas during July and August 1964. Populations on approximately 115,000 acres of grassland in 14 counties in the southern and central parts of Oklahoma and 5,000 acres of rangeland in Briscoe County, Texas, were classified as moderate. Light to noneconomic populations occurred in the remainder of the area surveyed in these two States. Incidental surveys in conjunction with other activities were made in grassland areas of Arkansas.

General rains and cool weather in early May resulted in considerable mortality to early instar nymphs in the Texas Panhandle. In Oklahoma, nymphal surveys in late April, May, and June verified the adult survey; and economic populations were found in the eastern, south-central, and western counties of this State, with threatening infestations in crop margins.

There were no large-scale organized cooperative control programs during the year. However, in Pittsburg County, Oklahoma, 6,541 acres of grassland were treated with technical malathion in July 1964 and 11,516 acres in June 1965. Control results were satisfactory.

Grasshopper counts as high as 25 per square yard occurred in Austin, Brazoria, Colorado, Fort Bend, and Gonzales Counties, Texas, during the summer of 1964. Landowners controlled populations effectively with the use of insecticide and bait applications adjacent to the field crops. Plant Pest Control activities were limited to surveys and technical assistance.

Table 7.--Grasshopper Control

State	Survey and detection	Control
	Acres infested	Acres treated
Oklahoma	160,500	18,057
Texas	45,000	...
Total	205,500	18,057



## IMPORTED FIRE ANT

*See also page*  
Fiscal year 1965 was a very productive year in the history of the Imported Fire Ant Program. Cooperation has always been good on this program, but this year there was more widespread interest, and more cash was contributed by States, counties, cities, and individuals than ever before since the program was started. Indications are that this will continue and increase in the years ahead.

Two things, in particular, have contributed to the increased interest in the Imported Fire Ant Program: (1) Each year the imported fire ant becomes more of a pest and nuisance, and people are realizing that it is a pest which cannot be dealt with on an individual basis. They are, therefore, organizing to obtain community- and county-wide action. (2) It has been clearly demonstrated that mirex bait is effective and can be used safely under all conditions.

In Alabama, State funds for imported fire ant control and eradication are limited, and suppressive operations have been confined to the northern part of the State. Efforts have been made to treat all known infestations in Limestone, Morgan, and Lawrence Counties. Temperatures are lower in these areas of infestation than in any other area in which the ant is found in the United States, and it would seem that ants from this location could adapt more quickly to points farther north than would be possible for ants from any other infested area. This is an added reason for eradication efforts in the area. A concerted effort has been made to thoroughly delimit infestations in north Alabama; and, where feasible, treatments have been applied. In this way, all known infestations were treated during the year in an area exceeding three million acres.

Spot infestations continue to appear in southern Arkansas. Infestations outside treated areas in Union and Ashley Counties are still being found. This year, for the first time, infestations were found in Chicot and Ouachita Counties. The infestation in Chicot County was found a few miles north of infested locations in Louisiana. As in previous years, infestations were treated as found. Cooperative Federal-State control programs were conducted on approximately 32,000 aggregate acres in the four-county area, and at the close of the year all known infestations had received control treatment. 2

In Florida, infestations were found for the first time in Bradford, Franklin, Sumter, and Wakulla Counties. During the year, 36 townships in 17 counties were found to be infested. The regulatory program remains strong. This year, 405 nurseries, containing 1,740 acres, were treated with soil applications of insecticides. These applications involved treatments of new areas of infestation, re-treatments of old infestations, and precautionary treatments of properties located near areas of infestation. The farmer program, coupled with cooperative Federal, State, and county programs, accounted for the treatment of approximately 445,000 acres. 4

In Georgia, survey was continued in an effort to detect new or incipient infestations, to delimit known infestations, and to determine the



8  
effectiveness of treatments. Small or incipient infestations were found for the first time in Berrien, Brooks, Calhoun, Evans, Jeff Davis, Putnam, Tattnall, and Wilkinson Counties. These finds indicated a natural spread or a spillover from adjoining counties. Delimiting known infestations revealed numerous extensions; however, this was expected from natural flights. Very few active mounds were found in the mopup of the northern outlying counties treated, but active mounds were more numerous in the Savannah area. Nuptial flights were observed in the southern part of the State during most of the year. Five aerial contracts were completed in Georgia during the fiscal year. Two of these were in the vicinity of Atlanta; one involved areas in Baldwin, Jones, Pierce, Spalding, and Ware Counties; and two were in the Savannah area. In each instance, this work was a continuation of the program started in the previous fiscal year. A large part of the acreage in some of these blocks was re-treatment. There were 670,453 aggregate acres treated in these aerial contracts; and in addition, acreage was treated with ground equipment in Calhoun and Richmond Counties. All mounds found during survey and mopup operations were treated as they were detected.

4  
In Louisiana, infestation was found in Jackson, Natchitoches, Sabine, and Winn Parishes for the first time. All areas of initial infestation have been treated in Bienville, East Carroll, Lincoln, Natchitoches, West Carroll, and Winn Parishes. More than a million aggregate acres were treated during the year. This is the largest acreage treated in one year in Louisiana since the program began. The reduction in cost, to approximately 50 cents per acre for a single treatment, played a big part in the treatment of this record number of acres. The Louisiana Department of Agriculture's program of making insecticide available to individuals at cost continues to meet with wide approval by farmers. During the year, individuals purchased more than \$75,000 worth of material for the control of imported fire ants on their properties.

1  
In Mississippi, an infestation was found in Claiborne County for the first time. Extensions of infestations were found in several counties in peripheral areas, and small reinfestations were found in some of the treated areas. Aerial control programs involved all of Pike County and portions of eight other counties. More than 600,000 aggregate acres received treatment.

1  
Surveys were conducted in 99 of the 100 counties in North Carolina. No new counties were found infested; however, additional infested acreage was found in six counties previously known to be infested. An appraisal survey was conducted in a 134,000-acre block that had received two applications of mirex bait during the spring of 1964, and the results were very encouraging. The area was covered twice by experienced inspectors, and only five imported fire ant mounds were found. These mounds were in one small area consisting of approximately one acre.

4  
In South Carolina, surveys during fiscal year 1965 revealed infestations for the first time in four counties: Allendale, Bamberg, Colleton, and Hampton. These infestations were very small, ranging from only one or two mounds to 128 acres. Extensive delimiting survey was done, and extensions were found in 12 of the 17 counties previously known to be infested. Counties from which imported fire ants apparently have been eradicated are Clarendon, Edgefield,



Marion, and Spartanburg. No active mounds have been found in these counties for several years. More than half a million aggregate acres were treated by air with one application of mirex bait, 0.3 percent material, at the rate of 2½ pounds per acre. The largest single block treated was in the Charleston area, which included Charleston, Berkeley, and Dorchester Counties.

Systematic surveys were conducted for the imported fire ant over most of the State of Texas. Extensions to infestations in the amount of approximately 53,000 acres were found. Walker County was found infested for the first time during the year. Approximately 250,000 acres received treatment. Most of this acreage was in the eastern part of the Houston District. This exceeds the total combined treatments for all the other years. As of the close of the fiscal year, all known infestations in Angelina, Austin, Bexar, Brazoria, Dallas, Fort Bend, Galveston, Gregg, Harrison, Henderson, Smith, Victoria, Walker, and Wharton Counties had been treated. Most of these counties contained a relatively small amount of infested acreage.

Surveys were conducted in every county in the State of Tennessee and in 32 counties in Oklahoma with negative results.

Methods Improvement personnel of the Division and of the Regional headquarters developed an improved method for applying mirex bait for imported fire ant control. The bait is applied in a crisscross flight pattern, with half the total dosage applied in one flight direction and the remaining half applied at a 90-degree angle from the first application. The aircraft contractor provides aircraft guidance and all supporting requirements. The aircraft is allowed a full overall swath. The crisscross flight pattern is used for both control and eradication treatments. Eradication areas receive a second crisscross application four to six months after the initial treatment. This method results in the treatment of more acreage in a given period of time and thus is less expensive and more effective than the one previously used.

Several candidate insecticides were screened for use in bait and for soil residue. None of the materials tested showed any promise against imported fire ant. Nonachlor insecticide, an experimental compound, applied following a treatment with mirex bait, shows promise of preventing reinfestation for twelve months or longer.



Wherever the imported fire ant occurs--and in the infested area it is found in all environs--it is a problem, a nuisance, and a depreciator of economic value and a destroyer of worth.



This hay was abandoned; the ants so infiltrated the piles that it became completely useless.



This pasture has become completely overrun and fishing along the stream is now a hazard, not a recreation.





In reforested areas, the ant becomes a nuisance.

The value of pasture areas is adversely affected.



Harvesting the tung crop from infested groves is a problem.



Table 8.--Imported Fire Ant

State	Survey and detection		Control		Regulatory					Acres soil treated
	Sites surveyed	Acres infested	Acres treated		Acres inspected		Properties inspected <sup>1/</sup>			
			Ground	Air	Nursery	Other	Industrial	Other		
Ala.	35,187	110,984	26,297	90,750	5,878	8,573	468	239	9,105	
Ark.	17,352	21,190	...	32,500	...	...	...	...	...	
Fla.	5,805	436,994	2,374	509,615	2,250	8,756	384	449	3,139	
Ga.	33,080	1,426,144	1,655	741,046	2,055	706	137	...	1,460	
La.	22,176	749,015	6,663	1,043,491	10,827	1,067	200	297	1,954	
Miss.	20,590	379,483	35,528	622,791	3,058	448	461	81	758	
N. C.	75,613	56,217	1,895	55,000	...	...	...	...	...	
Okla.	202	...	...	...	...	...	...	...	...	
S. C.	22,806	380,387	9,238	571,876	185	...	10	7	48	
Tenn.	35,372	...	...	...	...	...	...	...	...	
Texas	42,089	52,614	12,902	253,219	2,746	71	2	1	1,523	
Total	310,272	3,613,028	96,552	3,920,288	26,999	19,621	1,662	1,074	17,987	

<sup>1/</sup> These figures represent "visits."



Table 9.--Imported Fire Ant

Commodities	Lots treated					
	Ala.	Fla.	Ga.	La.	Miss.	Total
Fruits and Vegetables	4	...	...	...	...	4
Nursery Stock	...	...	13	173	868	1,054
Soil	2,554	6	223	24	46	2,853
Machinery and Equipment	17	16	77	2	10,647	10,759
Other	25	...	12	...	2	39
Total	2,600	22	325	199	11,563	14,709







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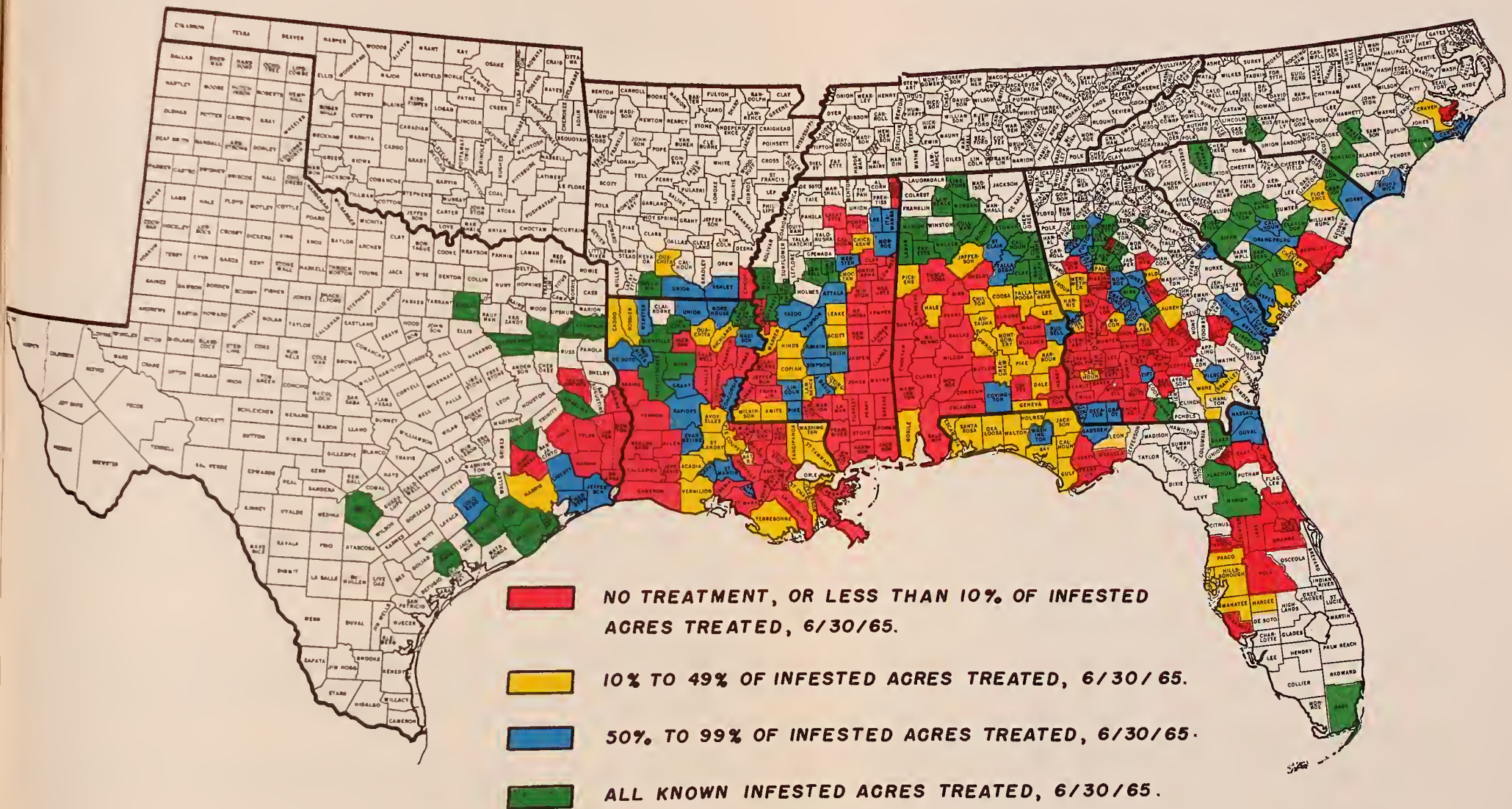






UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE - PLANT PEST CONTROL DIVISION  
SOUTHERN REGION

IMPORTED FIRE ANT









## JAPANESE BEETLE

In the Southern Region, the greatest amount of spread of the Japanese beetle occurred in the northern part of Georgia, where approximately a quarter of a million acres in 13 counties were added to the infested status. Although traps were placed in all noninfested counties in South Carolina, specimens were taken only from McCormick County, where light populations were found in a small infestation of about one square mile.

As there are only five counties (Montgomery, Lincoln, Clay, Chatham, and Anson) in North Carolina that have not been recorded as supporting Japanese beetles, the entire State has been placed under Federal and State regulation. Consequently, surveys are limited to population checks, primarily for regulatory purposes.

In the seven noninfested States of the Region, a comprehensive trapping program was completed. Care was taken to select the most likely locations. These included sites where specimens have been trapped previously, Army and commercial airports, railroad centers, trailer parks, produce markets, trucking terminals, etc. Also, inspectors assigned to other work in the field made visual observations, giving particular consideration to nurseries, orchards, and vineyards.

Regulatory treatment of nurseries in North Carolina and South Carolina required a great deal of time. Special attention again was given to the movement of produce from the mountain areas of North Carolina, certification for which was based on negative inspection or fumigation.

Control, other than for regulatory purposes, was limited to population suppression around Dahlgonega, Georgia, where Sevin treatment was applied, and to a few locations in Tennessee. An infestation found in an isolated valley in the southern part of Monroe County, Tennessee, received low-volume malathion treatments in connection with a Methods Improvement study. The spray was applied by helicopter on a regularly scheduled basis, and four applications had been made by the end of the fiscal year. The overall situation in Tennessee is very encouraging. Beetle populations are scarce. As a whole, populations on treated areas are being held in check, and buildups are occurring only in those places where "flagouts" prevented a complete coverage.

Some biological control was accomplished. Colonies of Tiphia vernalis were introduced in the northern part of Georgia and in areas of North Carolina where Japanese beetle population densities are heavy. Through community action, milky disease spores were applied in two localities in the mountain area of North Carolina.

Severe damage was done to gardens, corn, fruit trees, etc., in some areas of north Georgia where populations are steadily increasing.



Table 10.--Japanese Beetle

State	Survey and detection		Control			Regulatory				
			Chemical Acres	Biological No. parasites released	Acres inspected		Properties inspected <sup>1/</sup>		Acres treated	
	Sites trapped	Acres infested			Nursery	Other	Industrial	Other	Soil	Foliage
Ala.	287	...	...	...	...	...	...	...	...	...
Ark.	173	...	...	...	...	...	...	...	...	...
Fla.	254	...	...	...	...	...	...	...	...	...
Ga.	1,162	261,575	1,106	525	...	...	...	...	39	...
La.	53	...	...	...	...	...	...	...	...	...
Miss.	266	...	...	...	...	...	...	...	...	...
N. C.	10	...	334	800	1,324	1,025	1,544	138	361	...
Okla.	66	...	...	...	...	...	...	...	...	...
S. C.	783	640	...	...	1	...	10	...	2	...
Tenn.	1,677	4,020	1,569	...	...	1	2	1	57	...
Texas	146	...	...	...	...	...	...	...	...	...
Total	4,877	266,235	3,009	1,325	1,325	1,026	1,556	139	459	...

<sup>1/</sup> These figures represent "visits."



Table 11.--Japanese Beetle

Commodities	Lots treated				
	Georgia	North Carolina	South Carolina	Tennessee	Total
Fruits and Vegetables	...	578	...	...	578
Nursery Stock	...	289	11	...	300
Soil	2	199	1	56	258
Transplants	...	26	...	...	26
Machinery and Equipment	...	36	...	...	36
Other	...	26	...	...	26
Total	2	1,154	12	56	1,224







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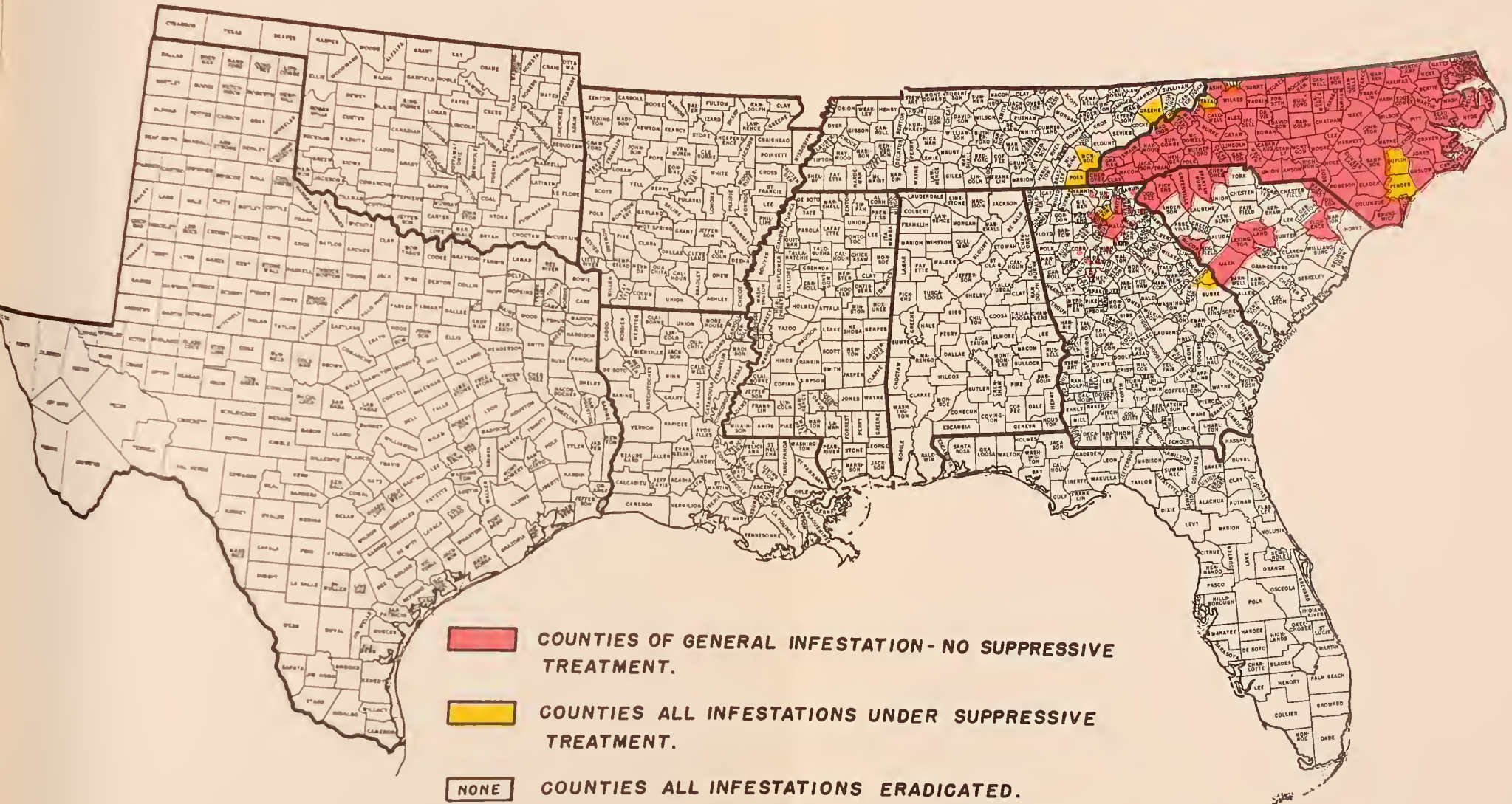






UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE - PLANT PEST CONTROL DIVISION  
SOUTHERN REGION

JAPANESE BEETLE









## KHAPRA BEETLE

A khapra beetle infestation was found in the Southern Region in February 1965, the first since 1960. A few specimens were found along a portion of one wall in the Manchester Warehouse, Dock No. 2, at the Port of Houston, Texas. Since records indicated that khapra beetle host material had never been stored in the warehouse and there were no cast skins or other evidence of an established infestation, it was concluded that the infestation was one of limited duration and that the beetles found had probably blown into the building from an infested ship docked nearby. Arrangements were made to fumigate the dunnage and other hazardous contents of the warehouse. Also, it was decided that the warehouse should be treated with three applications of malathion spray, after which thorough inspections should be made at intervals of not less than 90 days over a one-year period. The Plant Quarantine Division was responsible for the treatments, and the Plant Pest Control Division will assist in all inspections.

Elsewhere in the Region, the El Paso area was thoroughly surveyed again this year without finding khapra beetle. The last infestation there was found in 1960. A very thorough inspection was made in the Plains area of Texas and Oklahoma. Port warehouses were surveyed throughout the Region, and storage facilities throughout the rice-producing area were checked for contamination.

When it was learned that the S & W Feed Lots, Yuma, Arizona, had been found reinfested, an extensive survey was made of all grain storage facilities in the Region known to have shipped grain to this establishment during the past year. This involved a large number of establishments and locations. Results were all negative.

During the year investigations were made in every State in the Southern Region of material off-loaded from ships later found infested with khapra beetle. In August 1964, the SS HAI HO docked at several ports in the Southern Region and discharged cargo suspected of being infested with khapra beetle. Since much of this material had left the port of entry, it was necessary to follow the shipments to destination for inspection and treatment. Every State in the Southern Region received some of this material. Florida, Alabama, and Louisiana received most of it, and numerous inspections and treatments were necessary. Two lots of positive specimens were submitted from Florida--one from imported material at a plant at Wauchula and the other from a truck which had hauled cargo from the SS HAI HO at Pensacola. Properties and materials involved were treated and followup inspections were made of the properties.



Table 12.--Khapra Beetle

State	Survey and detection		Control	Regulatory		
	Properties			Properties inspected	Commodity lots treated	Transports treated
	Surveyed	Positive				
Alabama	193	...		2	45	...
Arkansas	325	...		32	30	...
Florida	44	...		54	24	10
Georgia	37	...		...	...	...
Louisiana	913	...		68	53	...
Mississippi	116	...		1	362	...
North Carolina	212	...		...	1	...
Oklahoma	208	...		...	27	...
South Carolina	69	...		...	...	...
Tennessee	206	...		12	13	5
Texas	2,918	1 <sup>1</sup> / <sub>2</sub>		9	32	5
Total	5,241	1 <sup>1</sup> / <sub>2</sub>		178	587	20

<sup>1/</sup> Treated by Plant Quarantine Division. Infestation located at port of entry.



## BURROWING NEMATODE

The burrowing nematode damages the roots of citrus, causing a condition known as spreading decline. As the population and damage of this pest increase, there is a corresponding reduction in yield which ranges from 50 to 80 percent in grapefruit and from 40 to 70 percent in oranges. Since Florida produces approximately 73 percent of the citrus in the United States, the burrowing nematode is a very serious threat to citrus production in the United States.

The primary objectives of this program are to prevent spread in commercial groves by establishing barriers until the infested trees become nonprofitable and to remove trees and treat the infested land as rapidly as possible. The cooperating agencies are making satisfactory progress on this phase of the program. Intensive surveys were continued during the year for accomplishment of control action, either push-and-treat or barrier. Additional surveys were made to evaluate the effectiveness of barriers and eradication treatment. Nurseries were inspected to determine compliance with regulations for movement of products. Nurseries in the citrus-producing area of Texas were surveyed for burrowing nematode with negative results. There were 144,206 samples processed in the laboratory in Florida.

Photographic detection techniques for citrus decline are under study from both air and ground, with the hope of a less costly and quicker method of finding infestation in citrus groves.

In 1964, the Citrus Experiment Station, at Lake Alfred, Florida, released three rootstocks: "Milam" and "Ridge Pineapple," classed resistant, and "Estes," rated tolerant. If one or more of these rootstocks prove suitable from all horticultural aspects, the problem of spreading decline will be limited to the citrus acreage remaining on susceptible stock.

In an effort to reduce personnel costs in surveys for burrowing nematode, a mechanical shaker was installed on a tractor-mounted auger. This was given field tests during the year but proved less efficient than the standard equipment. It is possible that mechanical changes may correct the deficiencies and speed up the operation of the auger.

Table 13.--Burrowing Nematode

State	Survey and detection				Control		Regulatory		
	Surveyed		Infested		Acres fumigated		Nurseries inspected		Citrus trees heat treated
	Properties	Acres	Properties	Acres	P & T	Barrier	No.	Acres	
Florida	2,099	35,559	146	1,022	509	1,036	442	1,656	25,693
Texas	57	469	2	2	...	...	...	...	...
Total	2,156	36,028	148	1,024	509	1,036	442	1,656	25,693



## SOYBEAN CYST NEMATODE

The soybean cyst nematode has been found infesting farms in 7 counties in Arkansas, 3 counties in Mississippi, 12 counties in North Carolina, and 13 counties in Tennessee.

Three methods of survey were used to locate infested fields: (1) observing for symptoms of the nematode attack, i.e., stunting and yellowing of the plants in the field; (2) collecting soil samples for laboratory processing; and (3) examining plant roots for cyst attachment.

Infestation in eastern North Carolina and in the States along the Mississippi River continued to intensify and spread locally. New county records of infestation were established in Cross County, Arkansas, Coahoma County, Mississippi, and Sampson and Wayne Counties, North Carolina. A positive collection was submitted for the first time from Hardeman County, Tennessee; however, subsequent samples were negative and there is reason to believe county names were confused on the labels. Hardeman County, therefore, has not been classified as infested.

In all cases, infestations found in the counties for the first time during the year were adjacent to previous infestations.

Quarantine enforcement continued in effect throughout the infested areas. This work included the cleaning of farm equipment, controlling the marketing of crops grown on infested land, and the examination of soybean planting seed for freedom of cyst contamination. Intensive surveys were made for regulatory purposes in connection with the production of sugar beets in Arkansas and Tennessee, and of tomato plants in Tennessee.

In the noninfested States, work on this program consisted of symptom surveys incidental to other work. In Alabama, some soil samples are taken each year and processed for both soybean cyst nematode and golden nematode. Irish potatoes and soybeans, together with other crops, are grown in rotation on a large acreage, particularly in Baldwin County. All surveys in these States were negative.

Tests of resistant soybean varieties look very promising, and it is hoped that some will be available for release to the public in the near future.

During the year, 3,700 nematode collections were submitted to the Gulfport Laboratory for identification; of these, 489 were positive. These collections were received from 19 soybean-producing States in the Central and Southern Regions in which surveys are conducted. At the end of the fiscal year, all samples received had been processed through Gulfport.



Table 14.--Soybean Cyst Nematode

State	Survey and detection				Regulatory		
	Surveyed		Infested		Acres inspected		Properties inspected
	Properties	Acres	Properties	Acres	Nursery	Other	
Alabama	1,015	42,104	...	...	...	...	...
Arkansas	3,866	146,841	101	11,422	190	39	353
Louisiana	315	35,047	...	...	...	...	...
Mississippi	692	42,167	7	690	...	...	...
North Carolina	2,730	37,104	108	3,064	...	...	93
Oklahoma	67	1,875	...	...	...	...	...
South Carolina	1,826	43,928	...	...	...	...	...
Tennessee	1,646	45,461	98	10,406	25	91	14
Total	12,157	394,527	314	25,582	215	130	460









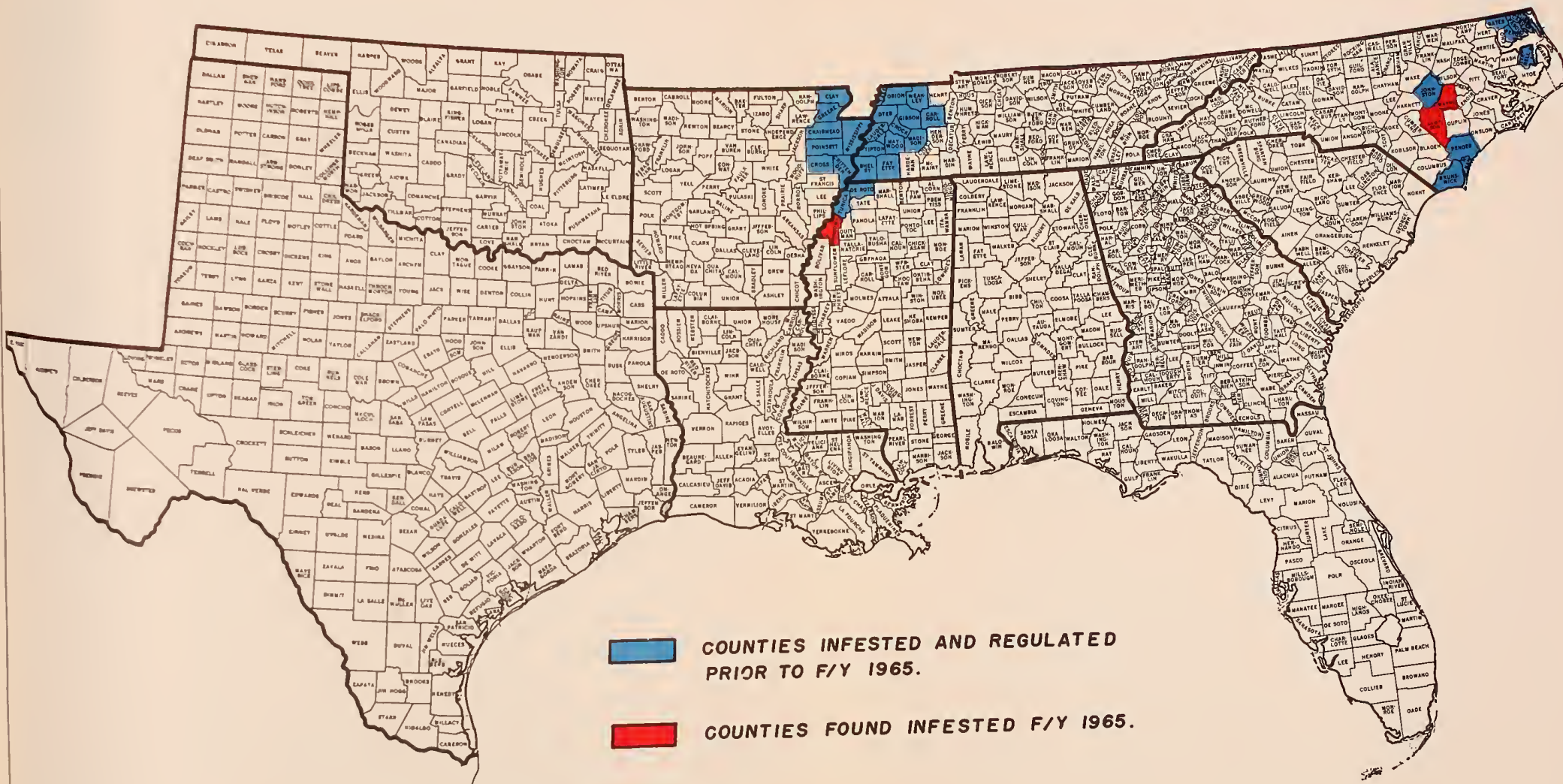






UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE - PLANT PEST CONTROL DIVISION  
SOUTHERN REGION

SOYBEAN CYST NEMATODE









## PEACH MOSAIC

Peach mosaic is a virus disease of peach and other stone fruits which causes mottling of the foliage and distortion and reduction in size of the fruit, making it unmarketable. The virus is spread by a very small eriophyid mite that spends most of its life under the bud scales. The use of budwood from infected trees is the principal means of spread of the virus.

In the Southern Region, annual inspections are made of budwood sources, nurseries, and their one-mile environs for the detection of infected trees, which are marked for removal by the grower. These inspections are made in the States of Arkansas, Oklahoma, and Texas--the only States in the Region in which the disease has been found.

The incidence of peach mosaic disease has been quite low for the past several years, and very few infected trees were found during fiscal year 1965.

Table 15.--Peach Mosaic

State	Survey and detection				Control	Regulatory	
	Properties		Hosts		Trees removed	Acres inspected	
	Surveyed	Infected	Surveyed	Infected		Nursery and environs	Budwood sources and environs
Arkansas	130	1	380,292	1	1	14	715
Oklahoma	77	...	1,223,685	...	...	2,560	1,920
Texas	248	12	338,483	19	10	431	709
Total	455	13	1,942,460	20	11	3,005	3,344







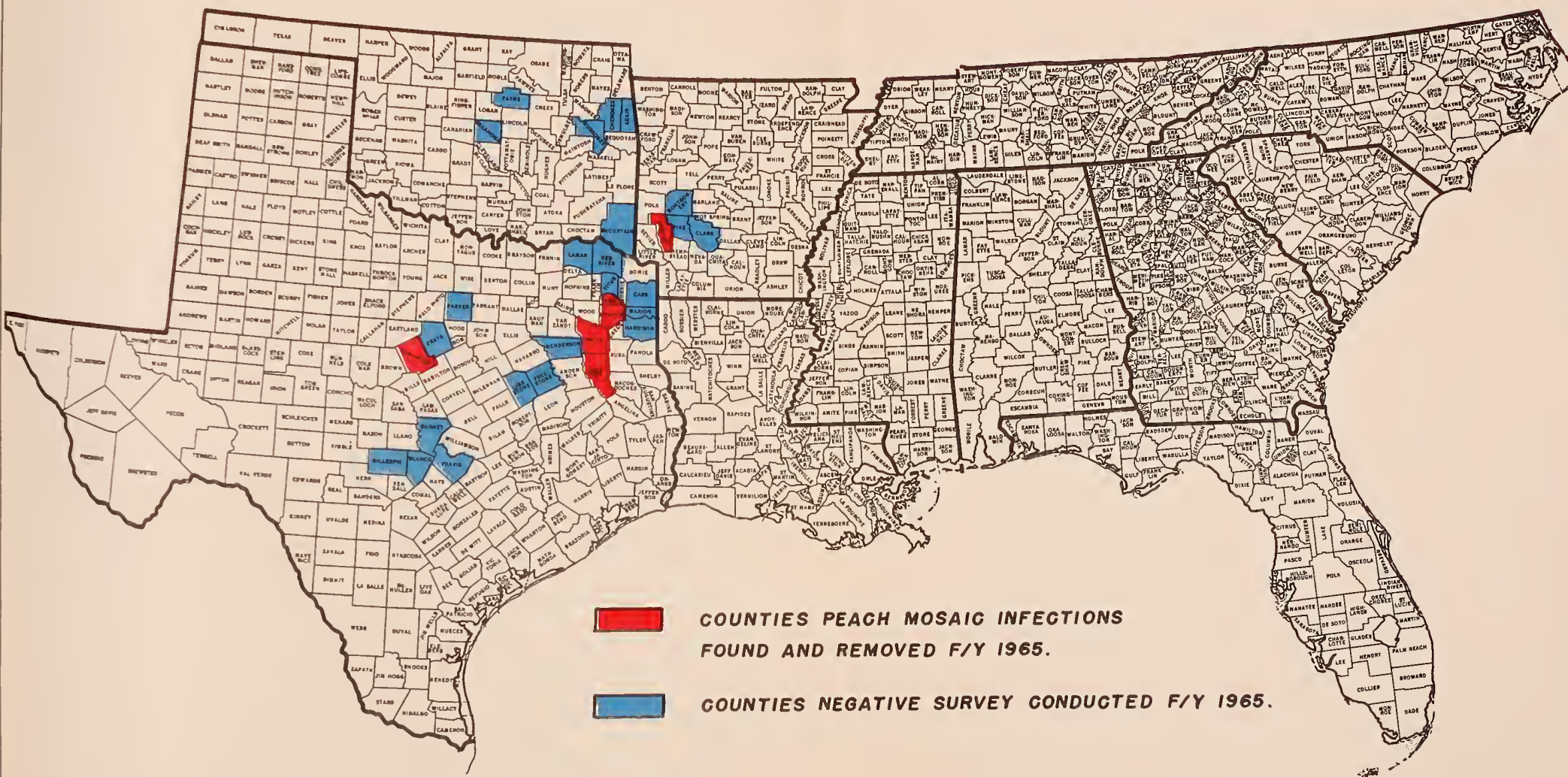








## PEACH MOSAIC









## PHONY PEACH

Phony peach disease affects peaches, plums, and other related fruits and is caused by a virus which is spread by the feeding of several species of leafhoppers native to the peach-growing area. On peach trees, infection results in short internodal growth, dense and darker colored foliage, the breaking of color in the blooms of some species, and a drastic reduction in the size and number of peaches produced. There is no known treatment for infected trees. All diseased trees found are delimbed immediately and later removed by the owner.

In the Southern Region, annual inspections for phony peach disease are conducted in the States of Arkansas, Georgia, Louisiana, Mississippi, South Carolina, and Texas. Wild plum thickets in the environs of peach nurseries and commercial orchards are treated with herbicide, as these plants may be infected without exhibiting symptoms of the disease. Where properly conducted, this work has been very effective in reducing the incidence of infection in commercial plantings.

Table 16.--Phony Peach

State	Survey and detection				Control		Regulatory
	Properties		Hosts		Trees removed	Acres herbicided	Nursery acres inspected
	Surveyed	Infected	Surveyed	Infected			
Arkansas	163	15	565,595	25	25	...	19
Georgia	290	236	3,057,831	5,214	5,214	65	5
Louisiana	80	34	128,483	489	489	...	...
Mississippi	22	14	36,253	812	812	8	...
South Carolina	312	72	1,501,550	306	306	132	...
Texas	149	14	299,620	32	26	...	360
Total	1,016	385	5,589,332	6,878	6,872	205	384







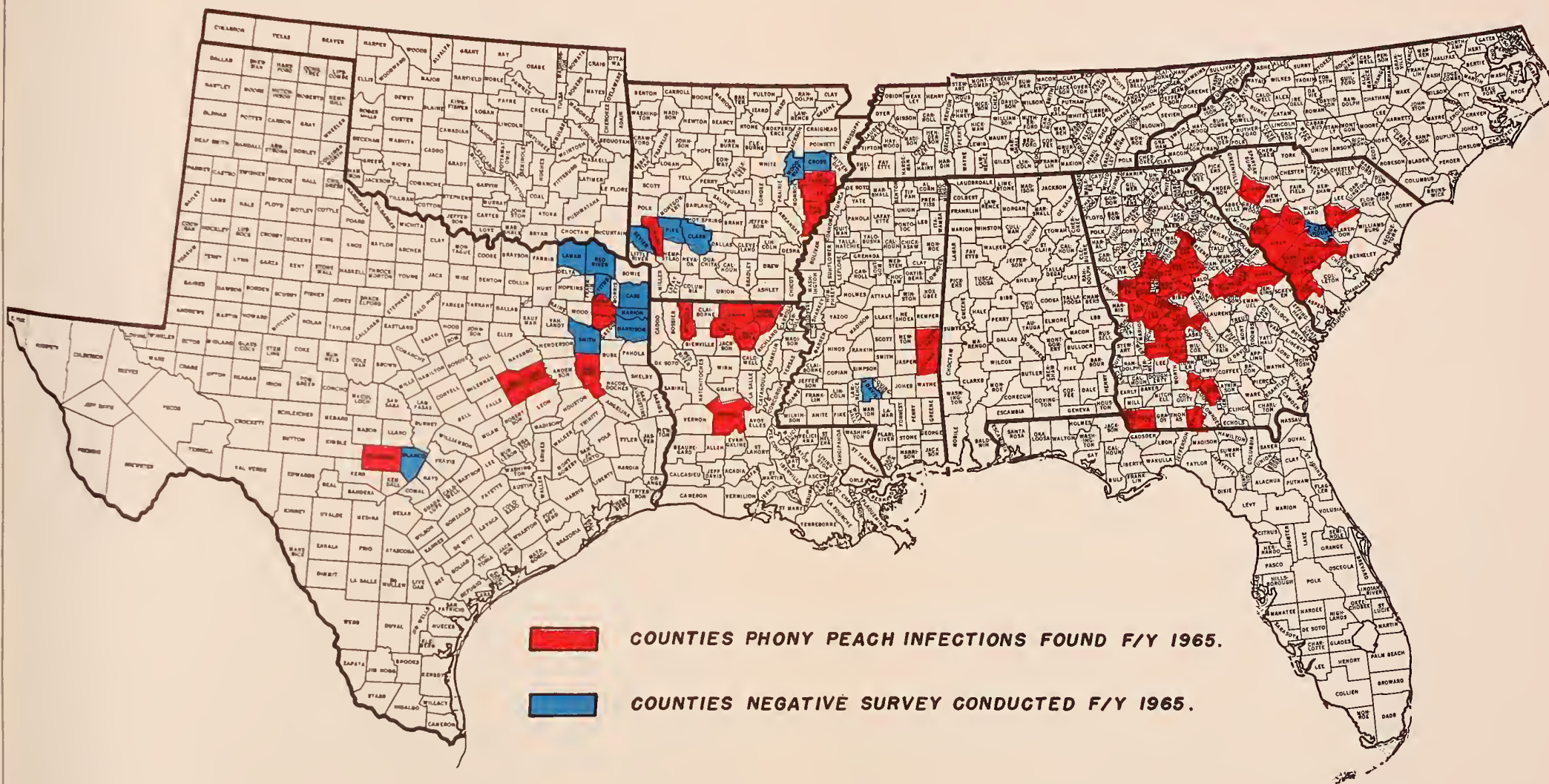








## PHONY PEACH









## PINK BOLLWORM AND WILD COTTON

### Pink Bollworm

There was very little change in pink bollworm populations in the generally infested States of Texas and Oklahoma during the year. Populations in eastern Texas and in Oklahoma were lighter than those found last year. Medium populations existed in six south-central counties of Oklahoma, and heavy populations occurred in Austin, Caldwell, Colorado, and Wharton Counties, Texas. Buildup in the El Paso Valley caused the El Paso Valley Cotton Producers Association to request that the Texas Department of Agriculture require stalk destruction for El Paso and Hudspeth Counties. Populations in the Coynosa area of Pecos and Reeves Counties were considerably lighter than those recorded the previous year.

Only two pink bollworms were recovered from two widely separated counties in Arkansas. Three parishes in northwestern Louisiana were found infested. In comparison with the record for last year, this is a decided decrease in pink bollworms recovered and in the number of counties infested.

Lint cleaner inspection is the predominant method of survey in Texas and Oklahoma, but it is supplemented by gin trash and some boll and bloom inspection as time and opportunity permit. Gin trash inspection is used extensively in Arkansas, Louisiana, Tennessee, and Mississippi, and to a lesser extent in Alabama and Georgia. In all States supplementary methods of inspection are used. Surveys in all States east of the Mississippi River were negative.

Unfavorable weather, late crops, and other factors delayed completion of cultural control operations in Arkansas, Louisiana, and Texas--the three States having mandatory stalk destruction dates. In most areas, final results were generally satisfactory.

Regulatory activities were heavy, but normal, throughout the regulated area. Fumigation of farm equipment, especially mechanical cottonpickers, also was heavy during a portion of the year. Good cooperation was received. Inspection stations were operated on the Texas-Louisiana, Texas-Arkansas, Oklahoma-Arkansas, and Arkansas-Mississippi State lines during the active season.

### Wild Cotton

A slight increase in funds allotted for the Wild Cotton Program over those for the previous year permitted a more thorough coverage of wild cotton locations. All the known infested sites were inspected at least once, and many of the more favorable locations were scouted a second time. In addition, surveys were conducted at suitable sites not known to support wild cotton. Dooryard plantings were inspected in all counties where the Florida Division of Plant Industry prohibits the growing of cotton, with the exception of Broward County.



The total number of pink bollworms found was less than the number found the previous year, although there was an increase in the number of locations where pink bollworms were found. Domestic dooryard cotton in Tice, Lee County, Florida, was found infested. This is the first infestation in many years in dooryard cotton. Hibiscus and okra on the Keys and kenaf at the Lake Worth and Belle Glade Experiment Stations were inspected with negative results. A more intensive coverage of wild cotton locations and dooryard sites is expected to further reduce pink bollworm populations during the coming season.

Tests of several herbicides at various rates of application were begun on wild cotton by Dr. Sand. To date the results have been somewhat erratic. These tests are being continued.

New and faster boats expedite the working of the many isolated locations accessible only by water. The problem of hauling water and generating electricity for the camp at Cape Sable is expected to be eliminated through arrangements with the National Park Service for a connection with their supply system.

Table 17.--Pink Bollworm

State	Survey and detection			Control	Regulatory	
	Properties surveyed	Bu. of gin trash examined	Properties infested	Acres treated (mechanical)	Properties inspected <sup>1/</sup>	
					Industrial	Other
Alabama	530	321	...	...	...	...
Arkansas	17,558	49,751	<u>2</u> /	1,242,000	4,080	425
Georgia	...	436	...	...	2	...
Louisiana	4,021	10,850	30	124,361	2,214	1,970
Mississippi	5,962	6,985	...	...	75	3
North Carolina	68	...	...	...	...	...
Oklahoma	411	2,797	69	92,155	1,428	...
South Carolina	19	...	...	...	...	...
Tennessee	146	7,999	...	...	139	68
Texas	6,136	1,715	616	1,968,304	21,901	821
Total	34,851	80,854	715	3,426,820	29,839	3,287

<sup>1/</sup> These figures represent "visits."

<sup>2/</sup> One larva recovered from gin trash in Miller County and one in Yell County.



Table 18.--Pink Bollworm

Commodities	Lots treated							
	Ark.	Ga.	La.	Miss.	Okla.	Tenn.	Tex.	Total
Fruits and Vegetables	...	...	14	...	...	...	28	42
Cotton Products	1,793	104	1,980	...	9	30	340	4,256
Machinery and Equipment	39	...	24	8	4	...	321	396
Other	26	...	...	...	11	...	3	40
Total	1,858	104	2,018	8	24	30	692	4,734

Table 19.--Wild Cotton

State	Survey and detection		Control	
	Hosts		Mechanical	
	Examined	Infested	Plants	Acres
Florida	119,684	506	21,642	18,850
Total	119,684	506	21,642	18,850







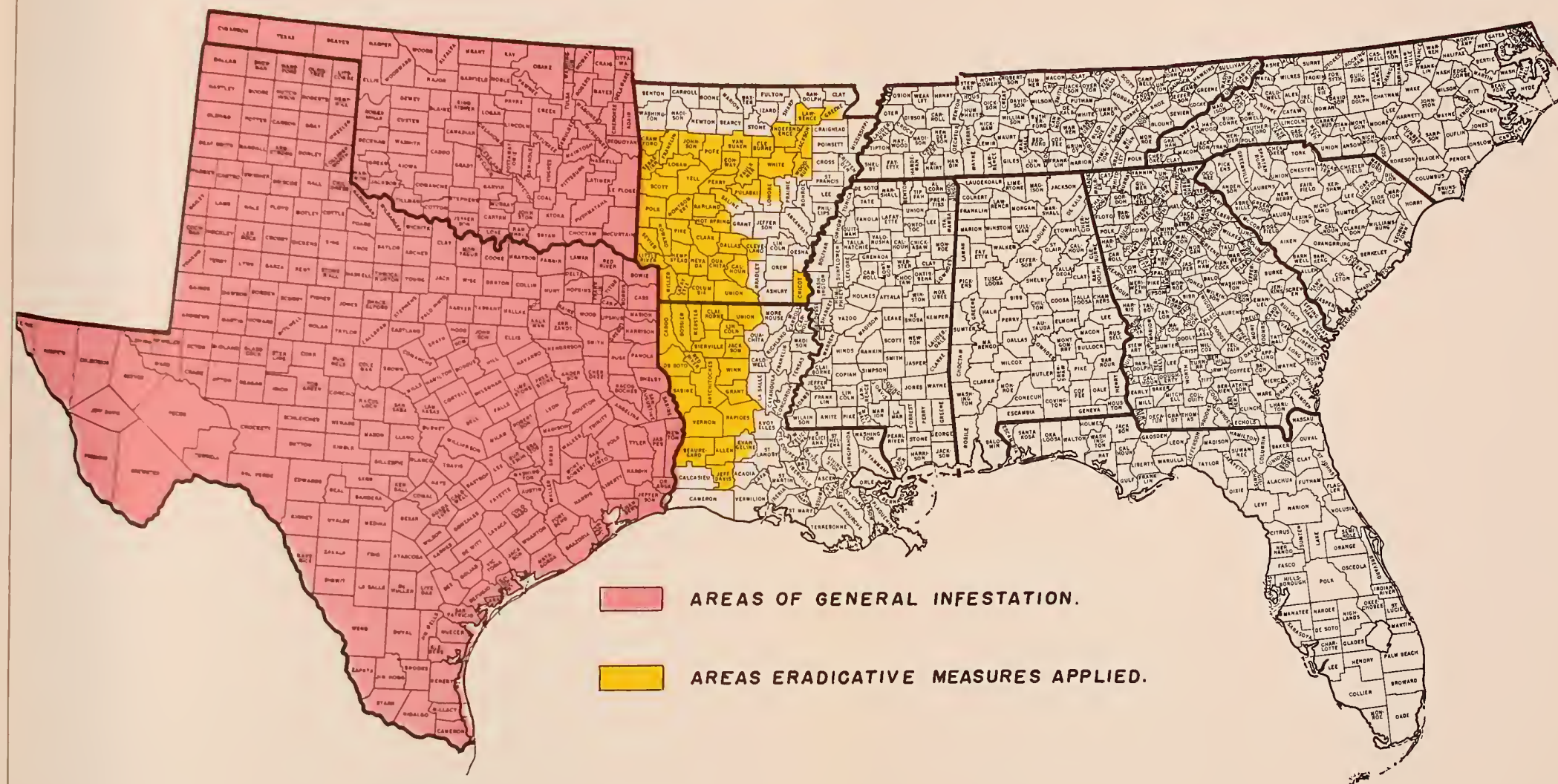








## PINK BOLLWORM









## SWEETPOTATO WEEVIL

Progress on the Sweetpotato Weevil Program during fiscal year 1965 has been somewhat erratic, with good progress reported in some States and little or no progress in others.

In Alabama, the infestations in Dale County have been eradicated; no live weevils were found in the county this year. Infestations were found only in a few dooryard plantings in Henry County. No commercial properties are now involved; in fact, no sweetpotato weevils were found in any commercial plantings anywhere in the State this year. This is considered quite an accomplishment when it is realized that two of the larger commercial sweetpotato-growing sections are in Mobile and Baldwin Counties, where weevils thrive in native morning-glories and other wild hosts along the coast and inland marshes.

The State of Florida is generally infested, and commercial production is of little consequence. For this reason, the State regulatory officials have little interest in the Sweetpotato Weevil Program. Our primary interest is in reducing the danger of spread from heavy infestations in the State to bordering counties in Alabama and Georgia and the shipment of early plants from interior locations in Florida to points north.

In Georgia, the program is showing satisfactory progress. Under planting permits from the State Department of Agriculture, the growers are treating all seedbeds, field plantings, and storage areas. This program has met with general approval and much success. During the year, some 2,500 properties were inspected and only 16 infestations were found, some of which were in native hosts in the more southerly counties.

The sweetpotato is one of the major cash crops in certain areas of Louisiana. This is especially true where farms are small and acreage is limited. The successful production of commercial potatoes in most sections is dependent upon the control of the sweetpotato weevil. The combined efforts of the grower, the regulatory agencies, and the Extension Service are required to prevent this pest from causing serious damage each year. Although there is some phase of control carried on throughout the year, the peak workload is during the harvesting season. State personnel assume the responsibility for the enforcement of quarantine regulations, such as treatments, cleanups, and certifications. The principal Division activity has been to assist with surveys within the eradication and nonregulated areas, and to assist with eradication measures where needed.

This year, surveys were made in 39 parishes of Louisiana, as compared to 27 the previous year. Many of these additional parishes are in the nonregulated area, and some have never been known to be infested. No new parishes were found infested. All infested properties in Caddo and West Feliciana Parishes were released. During the year, sweetpotato weevil infestations were found on 282 properties, and 216 properties were released. The regulated properties at the end of the year had increased by 66. This merely indicates that the weevils are known to be present on more properties, and it in no way reflects the degree of infestation on any given property.



In Mississippi, the program remained in almost the same status as last year. Additional infestations were found in a number of previously infested counties, but no infestations were found in any county not previously infested. Farmer cooperation was good, and all known infested sites in the eradication area were cleaned and treated.

Eradication is the objective of the Sweetpotato Weevil Program in South Carolina. Surveys were conducted in sweetpotato plantings and wild host plants in counties of the Coastal Plains section. Again this year, particular emphasis was given to survey in the counties of Beaufort, Charleston, Dillon, Jasper, and Marion. No additional infestations of sweetpotato weevil were found.

The South Carolina Quarantine prohibits the planting of sweetpotatoes within areas of weevil infestation. Inspections were made within these nonplanting zones for any sweetpotato plantings in violation of the quarantine and for volunteers from plantings of previous years. Those found were destroyed by the application of a herbicide.

An active herbicide program was conducted to hasten our objective of the program in South Carolina. The herbicide 2,4-D combined with an insecticide was used to destroy wild host plants and, also, to kill any weevils present. Through the continuation of this type of program, wild host plants have been greatly reduced, and the sweetpotato weevil population has been cut to a bare survival level. This work is progressing satisfactorily.

In Texas, fall survey was conducted with the use of ten temporary PPC employees working under the direct supervision of the Texas Department of Agriculture. During that survey, the same counties found infested in 1963 were found infested in 1964, with the addition of Anderson and Leon Counties, making a total of 11 counties found infested, as compared to 9 found in fiscal year 1964. However the total number of infestations was reduced from 168 to 119.

Warehouse treatment was not conducted during fiscal year 1965, as it was found that some storage locations were subject to recontamination due to crate trading among dealers. Spring field and bed treatment began in the infested counties on April 12. Plant Pest Control Division employed eight temporary men for this work. These men use four Federal vehicles and, as on survey, they work under the supervision of both the Jacksonville, Texas, work unit inspector and State Department of Agriculture personnel. Again this spring, treatment has been seriously hampered and delayed due to unseasonably cool weather and drought, mainly the latter. Until the middle of May, for the most part, field personnel were kept busy with regulatory activities, treating seedbeds and storage places.





In areas infested with the sweetpotato weevil, the production of a good crop of potatoes is dependent on an effective insecticide program. Dieldrin dust is applied to the top of the row while the potatoes are forming to prevent the weevils from entering the cracked soil and infesting the potatoes. The potatoes in the picture above were properly treated and protected; those in the picture below were not.





Table 20.--Sweetpotato Weevil

State	Survey and detection			Control			Regulatory		
	Properties			Acres treated		Bu. treated	Acres inspected		Properties inspected
	Surveyed	Active	Released	Chemical	Mechanical		Seed beds	Other	
Ala.	2,739	42	75	750	...	...	13	5,295	3,758
Fla.	28	735	...	...	...	...	...	...	...
Ga.	2,538	19	38	1,060	391	1,800	...	...	...
La.	16,626	476	216	10,629	17,098	1,342,376	12,670	63,628	11,301
Miss.	1,531	249	...	...	...	14	...	...	...
N. C.	57	...	...	...	...	...	...	...	...
S. C.	1,542	8	...	167	...	...	...	...	...
Texas	1,458	119	154 <sup>1/</sup>	571	...	...	...	...	...
Total	26,519	1,648	483	13,177	17,489	1,344,190	12,683	68,923	15,059

<sup>1/</sup> In Texas, farms are inspected, in the fall, in the counties in which sweetpotato weevil work is being conducted. Figures for number of infested properties are established each year, following the fall survey. This figure represents the difference in number of infestations in 1964 and 1965.





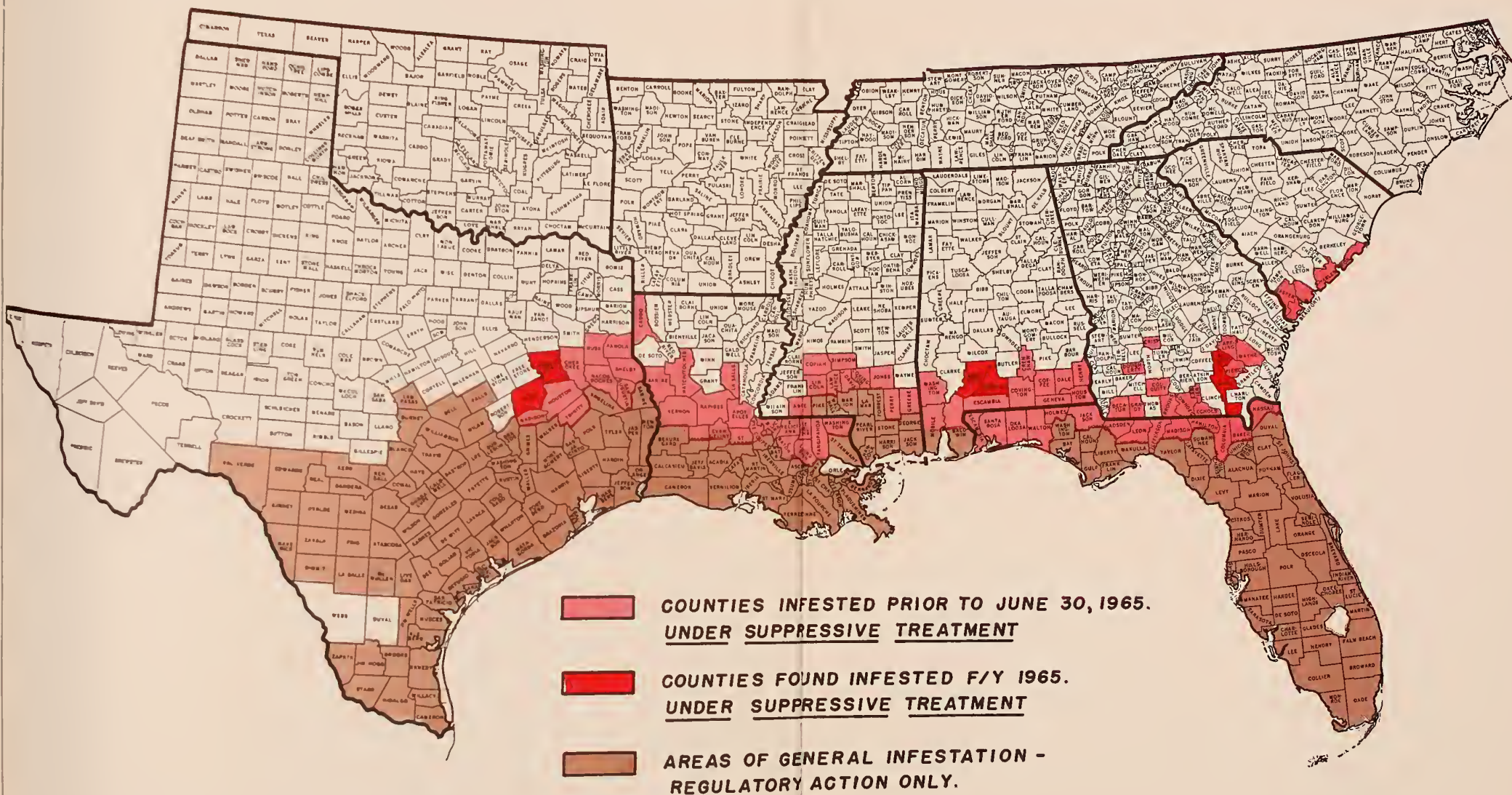






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 SOUTHERN REGION

SWEETPOTATO WEEVIL









## WHITE-FRINGED BEETLE

During recent years the insecticidal applications for the control of white-fringed beetles have been limited to regulatory locations and small outlying infestations. The results of this reduced control program are becoming evident more quickly and drastically than had been anticipated. The lack of control is being reflected in the number of new areas of infestation and the high population buildup in old areas. Additional infestations in Alabama, Mississippi, and west Tennessee have left only a few counties in the non-infested status, as shown on the map. Georgia is approaching a similar status, as is north Florida.

Because of restrictions placed on the use of chlorinated hydrocarbons, as well as lack of financial support, the prime objective of the White-fringed Beetle Program is directed toward prevention of spread. Consequently, survey and control activities are intensified in areas where movement constitutes a spread hazard. Much of the time of the inspectors is spent in the ornamental nurseries and in fields where regulated crops are grown. Efforts are being continued in Arkansas and South Carolina to treat all infestations where beetles are found, and some outlying infestations are treated in other States.

In the nursery area at Semmes, Mobile County, Alabama, where Graphognathus peregrinus was found to be resistant to chlorinated hydrocarbons, considerable progress is being made in cleaning up the infestation. Through the combined efforts of the nurserymen, the Alabama Department of Agriculture, and the Plant Pest Control Division, an all-out program has been launched to eradicate the beetle from this area. The program involves removal of old nursery stock and cleanup of the area, bush hogging and herbiciding weedy and rough areas, application of insecticide into soil, foliage treatments with DDT and Sevin, and methyl bromide fumigation of areas where beetle population is heavy and persistent. This brief experience with a resistant population has demonstrated quite obviously the seriousness of such a condition.

Because of population pressure in some of the old areas where surface applications of dieldrin were made several years ago in the environs of nurseries and industrial storages, it has been necessary to apply scheduled foliage treatments of either DDT or Sevin to prevent adults from migrating into these nurseries or storage areas.

During 1965, soil samples were taken for bioassay purposes from many nurseries and fields where potatoes and other regulated crops are grown. Results of these bioassay tests are used to determine when these growing areas should be re-treated.

Larval damage to peanuts, peas, some truck crops, and corn was extensive in some sections. One sugarcane farm was severely damaged in Mobile County, Alabama.





The severely damaged sugarcane in the picture above contrasts with the normal, healthy stand shown below. Both fields were treated with 20 pounds of 10 percent heptachlor granules in connection with an organized imported fire ant program in the fall of 1960, and with 20 pounds of 10 percent granular dieldrin disked into the soil in the fall of 1962. The undamaged field was additionally band-treated with chlordane disked in over the stubble in the fall of 1963. Normally, damage would not have occurred in 1965 following soil applications made in 1960 and 1962.





Table 21.--White-Fringed Beetle

State	Survey and detection		Control	Regulatory				
	Properties surveyed	Acres infested	Acres treated	Acres inspected		Properties inspected	Acres treated	
				Nursery	Other		Soil	Foliage
Ala.	13,965	29,753	16,681	10,932	10,662	2,116	9,391	9,092
Ark.	5,860	330	729	29	...	94	68	524
Fla.	3,211	3,950	...	584	422	380	560	...
Ga.	7,827	266,881	2,401	1,911	6,268	1,074	2,062	...
La.	5,919	6,418	3,045	6,523	856	324	585	1,135
Miss.	2,839	1,815	154	2,066	891	746	932	302
N. C.	39,309	3,364	3,144	1,351	1,985	1,343	509	...
Okla.	19	...	...	...	...	...	...	...
S. C.	5,218	802	802	120	150	24	29	...
Tenn.	31,069	5,884	3,344	6,934	746	450	1,315	277
Texas	169	...	...	1	...	1	...	...
Total	115,405	319,197	30,300	30,451	21,980	6,552	15,451	11,330

Table 22.--White-Fringed Beetle

Commodities	Lots treated										
	Ala.	Ark.	Fla.	Ga.	La.	Miss.	N. C.	S. C.	Tenn.	Tex.	Total
Fruits and Vegetables	66	...	...	...	...	...	...	...	...	...	66
Nursery Stock	9,173	...	...	258	107	21	84	3	405	1	10,052
Grain	...	1	...	...	...	...	...	...	...	...	1
Cotton Products	...	...	...	...	...	2	...	...	...	...	2
Transport	...	...	...	34	...	...	...	...	...	...	34
Soil	2,516	...	14	420	10	48	116	1	11	...	3,136
Transplants	13	...	...	...	...	...	...	...	74	...	87
Machinery and Equipment	4,588	28	16	3,196	...	10,470	201	6	14	...	18,519
Other	123	2	...	195	1	4	45	...	11	...	381
Total	16,479	31	30	4,103	118	10,545	446	10	515	1	32,278









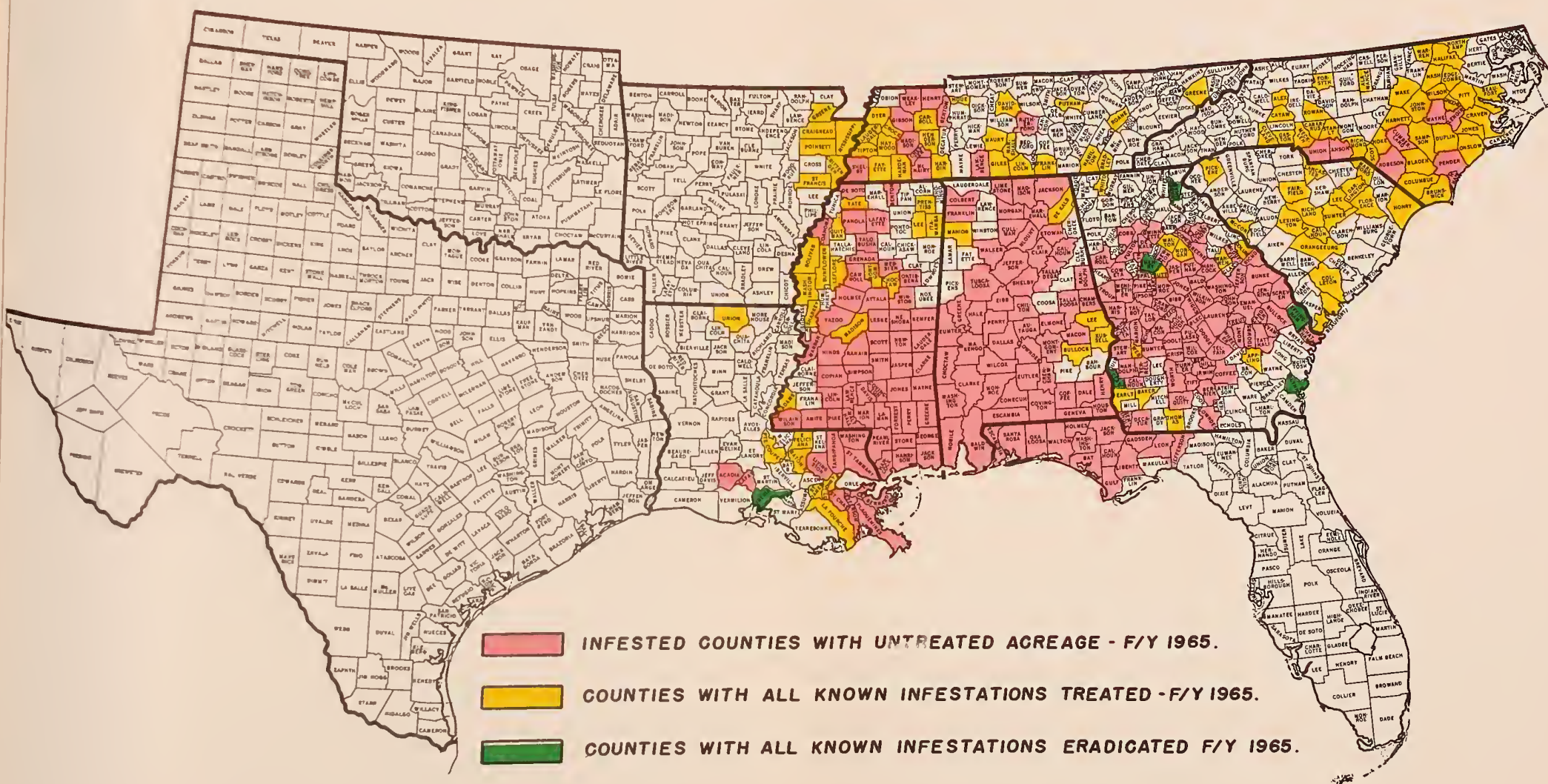






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 SOUTHERN REGION

WHITE-FRINGED BEETLE









## WITCHWEED

Witchweed is a threat to corn, sorghum, and sugarcane crops. When parasitized, the host plants wilt, yellow, and die. Presently, infestations are under control in 24 counties in North Carolina and 10 counties in South Carolina. These counties are contiguous.

Surveys for witchweed were made in all States of the Southern Region, but no infestation has been found outside the Carolinas. For the first time since the program was started in 1956, no new counties were found infested in either North Carolina or South Carolina. However, 16,639 additional infested acres were found in 17 of the regulated counties in North Carolina, and 976 infested acres in 7 of the regulated counties in South Carolina. Survey was very thorough, with emphasis placed on a three-county peripheral area around all known infested counties. The results were encouraging.

In addition to the regular surveys, inspections were made to determine the effects of current and past control measures. There were many fields once supporting heavy witchweed infestation on which no witchweed was found growing during the entire season, although adequate hosts were present to support witchweed. In other fields it was possible to reduce the number of applications of 2,4-D and still keep the witchweed plants from seeding. The success of this treatment is causing farmers whose fields are infested to plant more crops that are tolerant of 2,4-D. Preplant herbicides are being used extensively in other fields where it is necessary to plant crops susceptible to 2,4-D, and this practice has increased the effectiveness of the overall control program. All 2,4-D spraying was under contract, and a total of 447,997 aggregate acres received treatment.

Control measures have decreased damage to corn yearly, and during 1965 no large-scale damage was noted in the infested area where complete corn crop losses were common early in the program.

Several isolated infestations, ranging in size from one-half acre to five acres, were fumigated with brozone, applied with a chisel applicator at the rate of approximately 15 pounds of methyl bromide per 1,000 square feet. This treatment has proved to be a very effective method of treating small spot infestations.

Existing State and Federal quarantine regulations were enforced by State and Division inspectors in order to prevent the spread of witchweed through the movement of hazardous articles. Methyl bromide fumigations, high pressure water, and steam cleaning were some of the methods used to treat articles prior to certification. Designated processing plants are set up inside the regulated areas and regulated crops are allowed to move to these plants for processing, after which they are free to move into a normal channel of trade. The cooperative aid extended to Division personnel by growers, industry, and buyers has enabled inspectors to fully enforce the provisions of the quarantine with a minimum of problems.



With present herbicides, direct control of witchweed is not possible in cotton and other broadleaf crops, so indirect methods of control by removing the weedy grass host plants, such as crabgrass, are being investigated. Preplant, incorporated treatments of trifluralin at one-half to one pound per acre in cotton and soybeans have significantly reduced the stand of annual grasses and some broadleaf weeds. However, some weedy grasses are not controlled and they can serve as host plants to witchweed. These grass plants also produce seed, and this perpetuates the weed problem.

Postemergence application of several herbicides, applied repeatedly at intervals after cotton reaches the 6-inch stage of growth, looks promising for control of annual grasses that escape the trifluralin treatment. The most effective of these herbicides are disodium methanearsonate (DSMA); monosodium methanearsonate (MSMA); and 3-(3,4-dichlorophenyl)-1,1-dimethylurea (diuron).

Vernam (N-propyl-di-N-propyl thiol carbamate) gave excellent but not complete control of weedy grass host plants in peanuts.

Trifluralin gave control of witchweed in corn, and further work will be carried on in 1966 using trifluralin with a supplemental application of 2,4-D. Other chemicals that showed activity on witchweed in small plots and may be placed in more advanced tests are G-34360 and NIA-7251.

A gallonage study using 2,4-D with water as the diluent indicated that 3 and 6 gallons of water per acre did not give adequate coverage of witchweed if a vegetative cover was present. Ten gallons per acre gave adequate coverage, and the Monarch Whirl-Chamber 3/32 x 3/32 nozzle gave fewer fine droplets and less trouble with clogging than the Teejet 15003.

Helicopter application of 2,4-D invert emulsion showed that 3 pounds per acre of 2,4-D in 24 gallons of liquid gave excellent control of witchweed. Two pounds of 2,4-D in 12 and 16 gallons of liquid per acre gave variable results. Drift control was very good.





Witchweed is a most destructive parasite of corn. Pictured above is a field in Marion County, South Carolina, which was almost completely destroyed by witchweed in 1957. Since that time, witchweed in this field has been controlled and practically eliminated through the use of 2,4-D. The same field is shown below in 1965.







Where conditions permit, the 2,4-D is applied by the use of power machinery, as illustrated above.



When corn is broken down, or when for other reasons power equipment cannot be used, the fields are sprayed with hand equipment.



Table 23.--Witchweed

State	Survey and detection		Control	Regulatory		
	Properties			Acres treated	Properties inspected	Acres inspected
	Surveyed	Infested	Nursery			Other
Alabama	1,297	...	...	...	...	...
Arkansas	540	...	...	...	...	...
Florida	305	...	...	...	...	...
Georgia	421	...	...	...	...	...
Louisiana	1,678	...	...	...	...	...
Mississippi	671	...	...	...	...	...
North Carolina	54,751	587	339,285	7,776	554	5,844
Oklahoma	122	...	...	...	...	...
South Carolina	13,441	106	108,712	416	27	6,570
Tennessee	1,551	...	...	...	...	...
Texas	1,203	...	...	...	...	...
Total	75,980	693	447,997	8,192	581	12,414

Table 24.--Witchweed

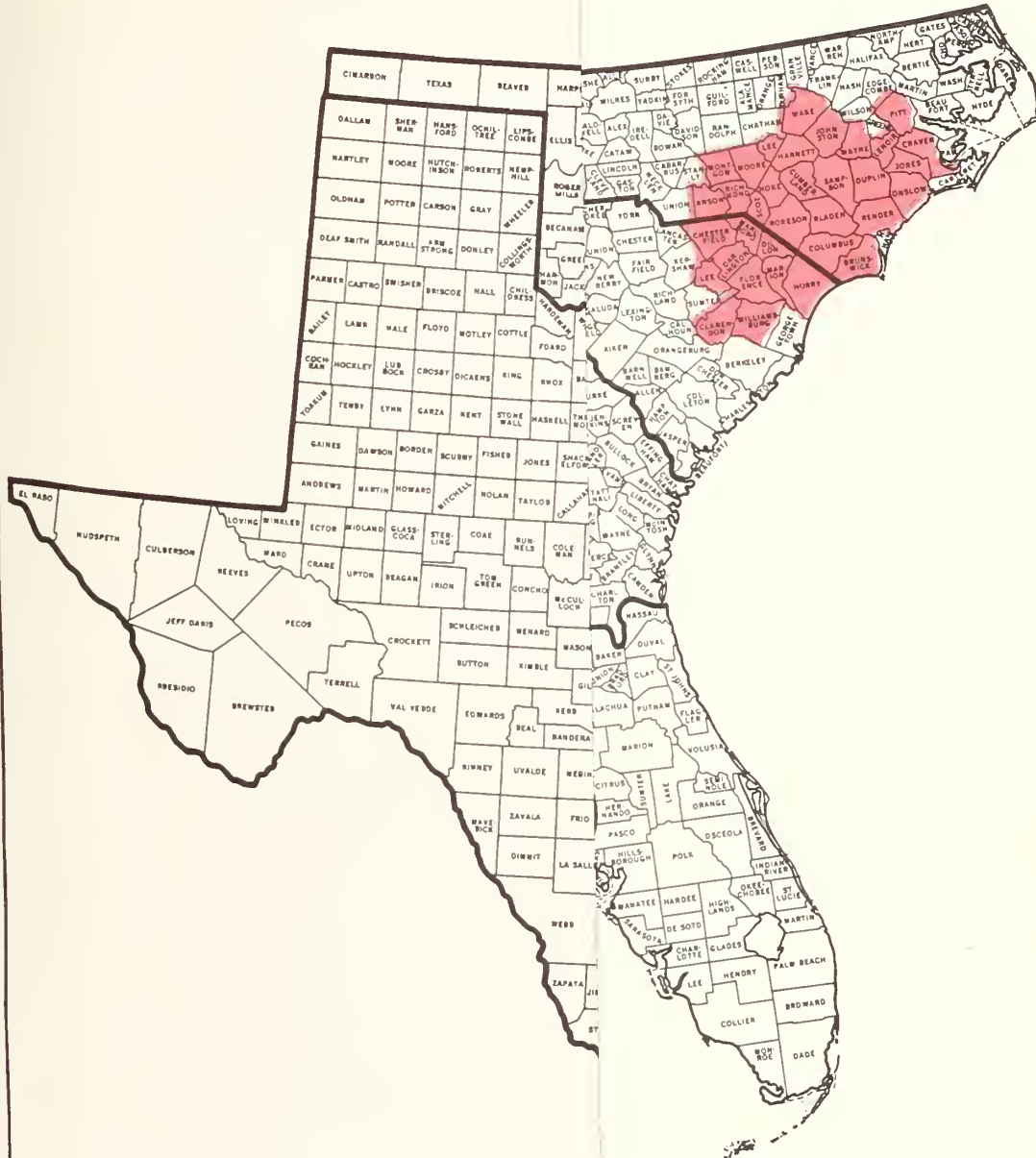
Commodities	Lots treated		
	North Carolina	South Carolina	Total
Fruits and vegetables	2,032	...	2,032
Grain	1,003	...	1,003
Cotton Products	84,004	17	84,021
Soil	1,076	2,073	3,149
Transplants	77	...	77
Machinery and Equipment	959	952	1,911
Other	283	6	289
Total	89,434	3,048	92,482







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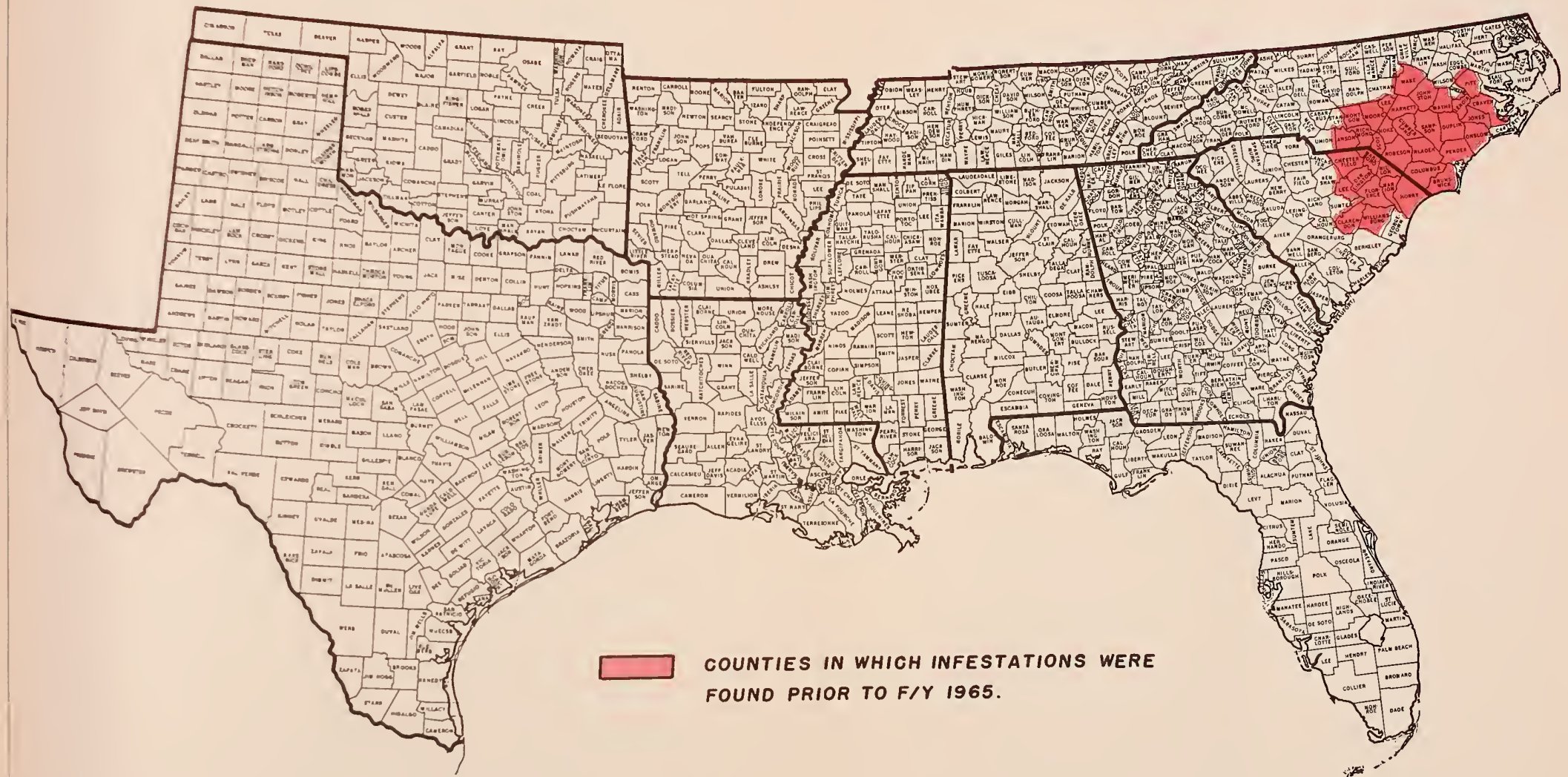






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SOUTHERN REGION

WITCHWEED



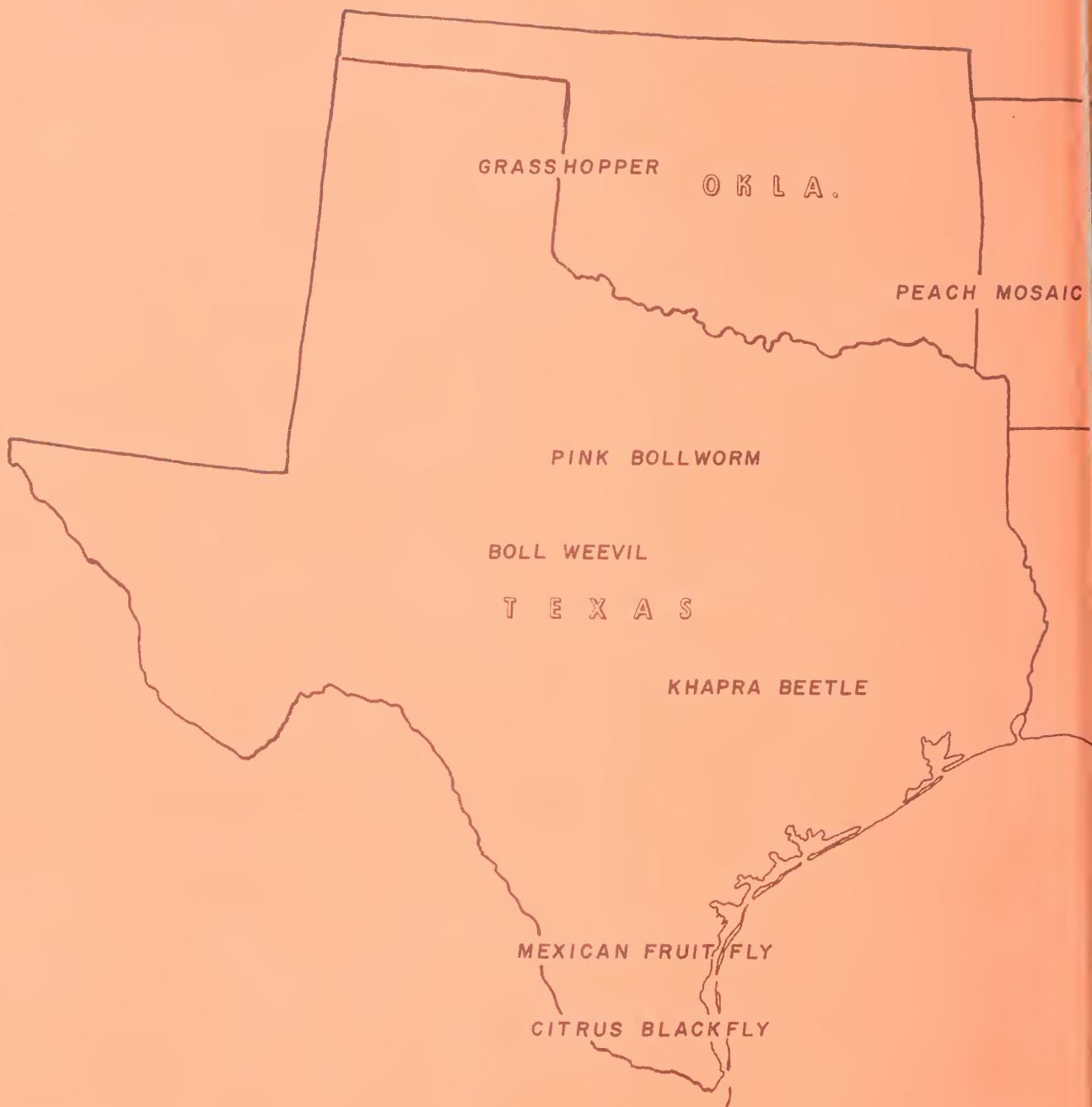














PART VI







PLANT PEST CONTROL  
COOPERATIVE PROGRAMS

WESTERN REGION

FISCAL YEAR

1965







# WESTERN REGION

PLANT PEST CONTROL DIVISION



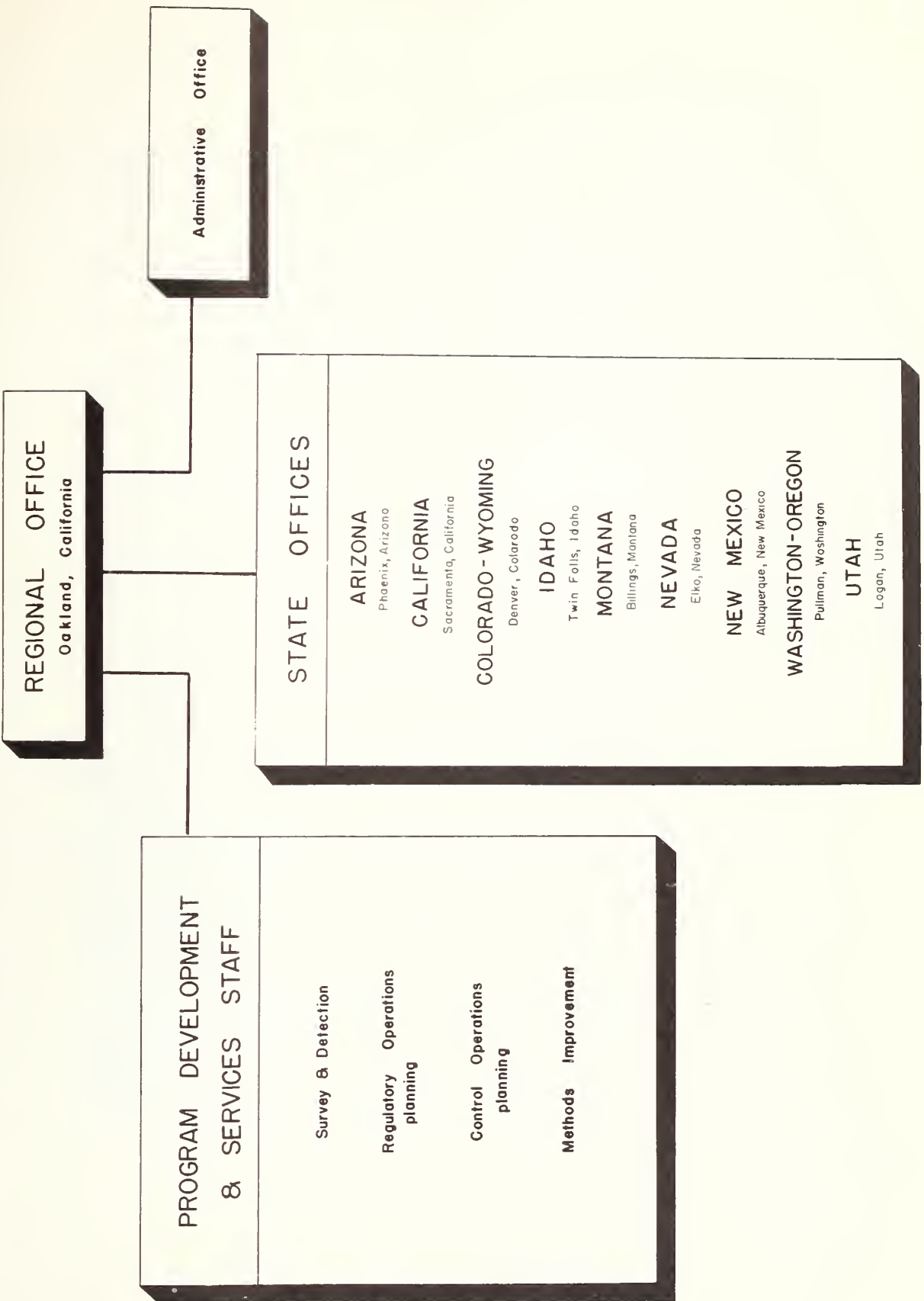
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WESTERN REGION







WESTERN PLANT PEST CONTROL REGION









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## PLANT PEST CONTROL COOPERATIVE PROGRAMS

The highlights marking 1965 Division accomplishments in the Western Region make a kaleidoscope of hope, satisfaction, and frustration.

They include near eradication of the stubborn, isolated Japanese beetle infestation in and near Sacramento, California. There have been no Japanese beetle finds for 3 years.

The outlook for sharply reducing peach mosaic occurrence is brighter in view of the promising vector control work being cooperatively done in the Lytle Creek, California, area.

In Hawaii the suppression of southern green stink bug by biological means; i.e., the cooperative rearing and releasing of egg and adult parasites, is securing gratifying results.

The khapra beetle, despite a high level of cooperative detection effort, was found only once, and the intervals between "finds" are encouragingly greater. Eradication continues to be feasible.

Border Mexican fruit fly sterile male releases by the Mexico Region have satisfactorily supplanted barrier spraying in California adjacent to Baja California. Systematic trapping for this pest continues in Arizona and California.

First "cross-country" use of IV Malathion to suppress extensive, heavy rangeland grasshopper infestations was very satisfactory. Cost, logistics effort, and application methods improvement have been encouraging. But to draw on knowledge and experience gained immediately after June 30, 1965, it appears that IV Malathion used under prevailing conditions encountered may not be the panacea we had hoped for. This portentous failure to kill rangeland grasshoppers under all circumstances begins to embarrass the Region's record of successful accomplishment. We hope to iron out the threatening trouble.

The most frustrating situation confronting the Division in the West is associated with cotton and two of its severest pests--pink bollworm and western cotton weevil. These two pests flourish in Arizona. Due to cooperators' stance, no organized suppression of either pest was done in fiscal year 1965. Neglect to control them resulted in the predicted resurgence of pink bollworm populations in central Arizona, where, from a single known infested field in 1963 growing season, the infestation has burgeoned, until now the populations are general in the Salt River Valley. Eastern Arizona infestations are flourishing; and only Yuma and Mojave Counties, the western Arizona border of cotton in the state, are free of the pest.







The mid winter migrant yearling birds are commercially damaging species in southwestern New Mexico, and growers are voluntarily adopting research-recommended cultural practices. California and Nevada action is free of yearling bullheads to date.

The western coyote control effort continues to be well supported by the volunteer Arizona coyote crew. An organized suppression work has been done against it. The growth of this culture, restricted in tribute except in western New and Mexico Counties, appears to have contributed to the persistence of the culture of both parties. This period has been one of the most for grave concern in California and Mexico. Cooperation in both areas are cooperating fully with the Division in intensive surveys for each year.

A June discovery of the golden weevils in Mexico, Vancouver Island, Canada, triggered an intensive survey of British Columbia by the Canadian to determine the extent of the infested area. It is now thought to have been limited. Associated regulatory and quarantine activities were undertaken. As far as the Western Region is concerned, we compiled from Canadian records an inclusive list of shipments of live material such as nursery stock, bulbs, and seed material coming from Vancouver Island to the western states. Careful surveys are planned at major ports to detect the golden weevils at destination points.

The well-planned and intensive GIP program in the Region is well under way.







## BARBERIS TRANSMISSION

Active barberry eradication programs are conducted cooperatively in the States of Colorado and Washington; the States of Montana and Wyoming are on maintenance. Nurseries, dealers, and seed dealers engaged in interstate shipment of Barberis are cooperatively inspected and certified when their operations are in compliance with Black Stem Rust Quarantine in the States of California, Colorado, Montana, Oregon, Utah, and Washington.

In June a meeting was held at Minneapolis, Minnesota, for the purpose of revising the Black Stem Rust Quarantine. Each registered Region contributed to the suggestions under consideration.

Surveys are made in cooperation with the Forest Laboratory at Ft. Belk, Minnesota, for stem rust in grain fields in the Western Region. Losses from stem and/or leaf rust were only recorded as a trace on wheat and/or barley in Colorado and in Wyoming. In Whitman County, Washington, a small area of Nelson wheat located close to rust-infected barberry and become infected and was so severely rusted that, had it spread extensively, it could have caused major damage reminiscent of the widespread losses in the 1930's and 1940's from stem rust.

Heavy black stem rust losses occurred in eastern and northeastern Montana counties. Winter wheat varieties of Cheyenne and Itana suffered losses averaging 10 percent for the State. Some fields in Fallon, Prairie, McCone, and Dawson Counties suffered 50 percent losses.

In Colorado the majority of the cooperative rework survey was in the counties of Archuleta, La Plata, Montezuma, and Montrose. These counties are in the area of the State that was originally heavily infested with the native barberry, Barberis fendleri. Some 60 square miles were surveyed and barberries were removed as discovered.

Other areas of Colorado were inspected for introduced barberry, Barberis vulgaris, and its horticultural varieties. These areas are on a rework basis, and some 60 square miles were also surveyed. There are 20 Colorado counties in which work needs to be done.

A total of 100 square miles was intensively surveyed, much of it in heavily brushed or wooded areas in seven eastern Washington counties. The major work was in Spokane, Stevens, and Whitman Counties, and more particularly in the latter. Also, all of the ornamentals in a number of towns in the seven counties surveyed were checked on a block-by-block basis.







# BARGERRY ERADICATION

Fiscal Year 1965

State	Survey and Detection				Control	Regulatory			
	Sq. Mi. Surveyed	Properties Reinspected	No. Properties Found With Bushes	Plants Destroyed		Nurseries Inspected		Other Properties Inspected	
						Number	Acres		
California	0	0	0	0	39	1,324	1		
Colorado	128	432	84	75,253	16	273	1		
Montana	2	1	0	14	5	43	0		
Oregon	0	0	0	0	53	1,425	3		
Utah	0	0	0	0	7	79	0		
Washington	100	880	98	1,331	23	806	4		

\*Colorado: New - 3  
Old - 81

Washington: New - 20  
Old - 78







## GRASSHOPPER CONTROL

Serious widespread infestations of grasshoppers in 1965 occurred in four states of the Western Region. Idaho, Montana, Utah, and Wyoming shared this somewhat dubious honor. The spring weather in each state was characterized by long periods of cold and rain. Apparently the only effect this had on grasshoppers was a delay in hatching and some retardation of the rate of development.

In Utah the heaviest infestations of the past 25 years plagued farmers and ranchers. Cooperative control programs were successfully undertaken in Juab, Sanpete, and Tooele Counties, but infestations extended far beyond those areas. For the first time in many years the Utah State Department of Agriculture made funds and personnel available to cooperate in grasshopper control. The State Department also, in eight instances, issued cleanup orders in Sanpete and Tooele Counties, requiring individual ranchers to participate in the control campaigns which were pointed, hopefully, at county-wide elimination of the grasshopper problem for several years. The results were gratifying. Except for a few local areas where farmers did not spray, only noneconomic infestations remained at the season's end. Malathion LV at the rate of 8 fluid ounces per acre gave uniformly good control results. One area of 2,000 acres was rained on about 2 hours following spraying. Results there were not so good, but respraying was not required.

Control work was undertaken in nine counties in central and western Idaho. Over 300,000 acres were sprayed, with more than two-thirds being in the western counties. Results were quite satisfactory, even though about 10 percent of the area in the west required respraying. The failure there was thought to be due both to rain and nozzle size. Rancher cooperation was more pronounced than usual in this area where, frequently, federally owned and managed lands support the bulk of grasshopper infestations.

A Forest Service nursery east of Boise required protection from grasshoppers. The nursery was sprayed by the Forest Service with ground equipment to protect plantings until FFC could get the aerial application program under way. This was a very rough area, but adequate results were obtained with the equipment used.

The remaining areas sprayed in Idaho were along the South Fork of the Payette River and north of Twin Falls. The former area is winter range for game animals, and the work was done at the request of the Forest Service. The latter areas were principally reseeded BLM lands and were sprayed to protect these grasses as well as to support control work done during the 1964 control season. On this job we were able to obtain some valuable information regarding size and







position of nozzles, drift, type of nozzles, and application rates. Best results were obtained with minispin nozzles and with other nozzles that emitted small droplets of spray material. The manufacturer contributed Malathion for use in the test areas.

Grasshopper infestations were heavy in many Montana counties, and inquiries about control were received from six widely separated areas. However, cooperative work was undertaken only in Big Horn County, where nearly 400,000 acres were sprayed.

The acreage sprayed in Wyoming was almost as great as that in Montana, and the bulk of it was in Sheridan County, very near the Montana work to the north. Results in both Montana and Wyoming were somewhat less than desired. A variety of circumstances are thought to have contributed to the fact that 60,000 acres in Montana and about twice that amount in Wyoming required retreatment. Weather, pilot error, rough terrain, and the short residual life of the insecticide were factors contributing to the less-than-satisfactory results. Before the next control season we hope to be able to solve some, if not all, of the problems associated with poor kills.

In all of the states where cooperative control was necessary, the migratory grasshopper (*Melanoplus sanguinipes*) was present as a dominant species. Other species present, and at times dominant, included *M. bivittatus*, *Camula pellucida*, *Aulocara elliotti*, and *M. packardii*. All of these species have been prominent during past outbreaks, and this year, in spite of weather conditions considered unfavorable to grasshoppers, they developed in outbreak numbers in more or less limited areas.

In the remaining states of the Region, grasshoppers were numerous only locally. Some control in Arizona was done to support a research program of EWT, and a small acreage was treated with Sevin on the Tulelake Refuge in northern California. Near Medford, Oregon, FPC treated about 850 acres of a reforested area to protect young pines from defoliation by grasshoppers. This was considered a very worthwhile and successful operation. Other expected control areas in Oregon were "washed out" by heavy rains.

This season's control covered only a fraction of the work which should have been done. There were heavy populations of grasshoppers in several areas of Arizona, Idaho, Montana, and Oregon where control was needed but not undertaken. The excellent growing conditions helped the range to support heavy populations of grasshoppers, without the vegetation exhibiting signs of great damage. This factor in several instances was the principal reason why much additional control work was not requested.







# ORANGE/LEMON CONTROL

State	Survey and Detection		Control
	Values Indicated	Values Reported	
Arizona	1,457,900	1,000	
California	173,200	1,000	
Colorado	0	0	
Hawaii	0	0	
Idaho	1,120,000	300,000	
Montana	3,194,000	100,000	
Nevada	172,400	0	
New Mexico	5,000	0	
Oregon	205,000	0	
Utah	706,100	0	
Washington	17,000	0	
Wyoming	1,156,000	300,000	

\*Adult Survey - Fall 1964

\*\*Control Season 1965

\*\*\*60 acres sprayed 6 times







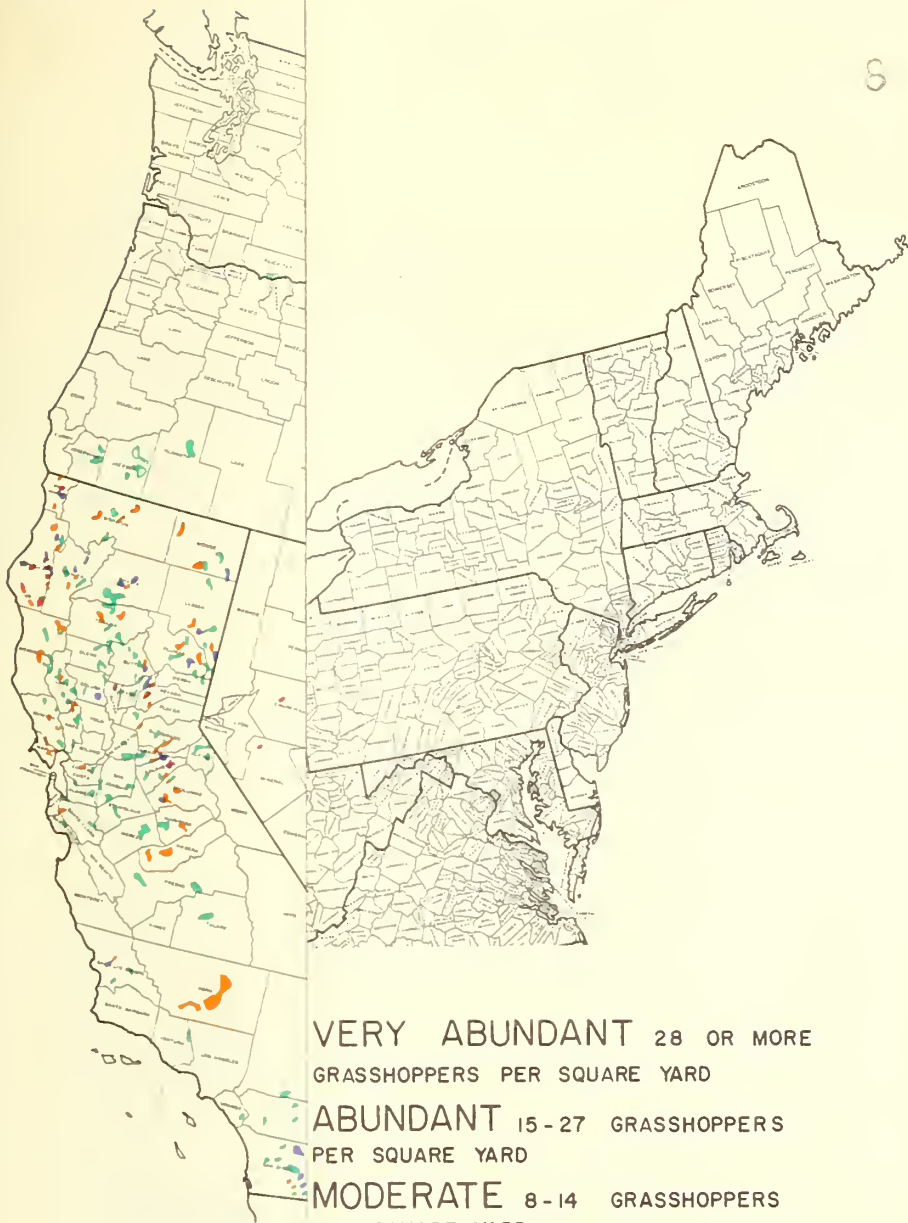
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INFESTATIONS - AC

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VERY ABUNDANT 28 OR MORE  
GRASSHOPPERS PER SQUARE YARD

ABUNDANT 15-27 GRASSHOPPERS  
PER SQUARE YARD

MODERATE 8-14 GRASSHOPPERS  
PER SQUARE YARD

LIGHT 3-7 GRASSHOPPERS PER  
SQUARE YARD

SOLID COLORS - RANGELAND INFESTATIONS  
STIPPLED COLORS - CROPLAND INFESTATIONS

FOR CONTROL ON CROP OR RANGELAND NEXT SEASON  
D UPON TYPE OF HABITAT, SPECIES PRESENT, WEATHER,  
ON OF VEGETATION.

SEE RE

FORMATION CONCERNING THE GRASSHOPPER PROBLEM  
AREAS CAN BE OBTAINED FROM STATE PEST  
FFICIALS, COUNTY AGENTS, AND PLANT PEST  
VISION PERSONNEL.

TOTAL  
RES

5,000  
8,700

7,900  
3,200  
0,800  
4,000  
2,400

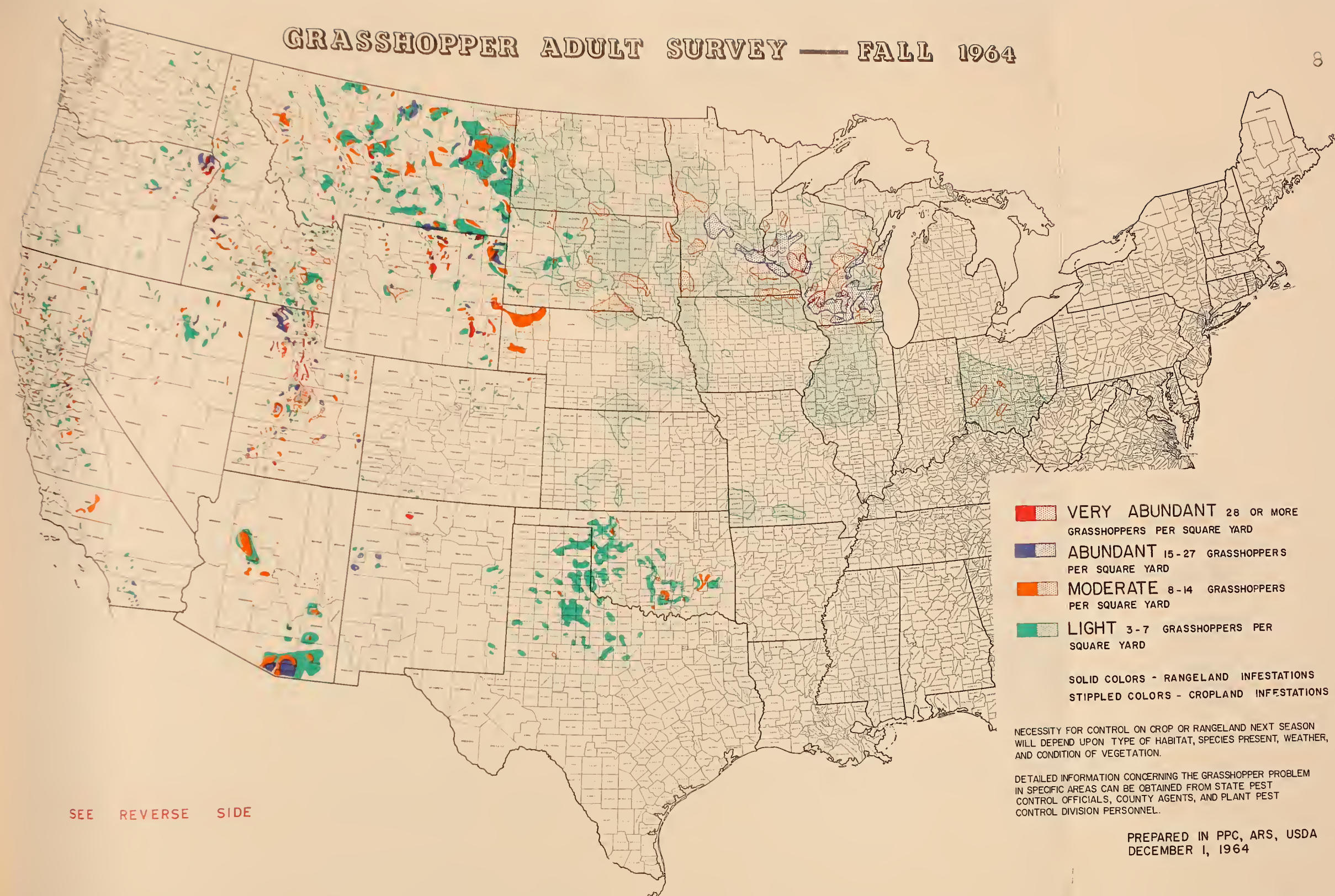
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# GRASSHOPPER ADULT SURVEY — FALL 1964

8



- VERY ABUNDANT** 28 OR MORE GRASSHOPPERS PER SQUARE YARD
- ABUNDANT** 15-27 GRASSHOPPERS PER SQUARE YARD
- MODERATE** 8-14 GRASSHOPPERS PER SQUARE YARD
- LIGHT** 3-7 GRASSHOPPERS PER SQUARE YARD

SOLID COLORS - RANGELAND INFESTATIONS  
STIPPLED COLORS - CROPLAND INFESTATIONS

NECESSITY FOR CONTROL ON CROP OR RANGELAND NEXT SEASON WILL DEPEND UPON TYPE OF HABITAT, SPECIES PRESENT, WEATHER, AND CONDITION OF VEGETATION.

DETAILED INFORMATION CONCERNING THE GRASSHOPPER PROBLEM IN SPECIFIC AREAS CAN BE OBTAINED FROM STATE PEST CONTROL OFFICIALS, COUNTY AGENTS, AND PLANT PEST CONTROL DIVISION PERSONNEL.

PREPARED IN PPC, ARS, USDA  
DECEMBER 1, 1964

SEE REVERSE SIDE



UNITED STATES DEPARTMENT OF AGRICULTURE  
Agricultural Research Service  
Plant Pest Control Division

TO COOPERATORS:

This map is based upon the results of cooperative grasshopper adult surveys made during the late summer and fall of 1964. The survey reveals where and how many grasshoppers infest an area, and indicates the potential severity of infestations for 1965. Nymphal surveys, made in the spring, determine population densities, and indicate those areas where control may be necessary in 1965.

The infestations in croplands, shown on the map in stippling, appear to have decreased in some of the North Central States below the level which was indicated in the 1963 fall survey. Control on those lands will be handled by the farmers with technical assistance from Division and State personnel. The infested range areas, shown on the map in solid colors (orange, blue and red only), total 8,711,400 acres in 14 Western and Midwestern States. Shaded areas on the map are diagrammatic. Within these areas, infestations may be solid or spotted.

RANGELAND GRASSHOPPER INFESTATIONS - ACREAGE BY REGIONS, FALL 1964

(Moderate Populations or Above - Orange, Blue and Red)

REGION AND STATE	LANDOWNERSHIP - ACRES		TOTAL ACRES		REGION AND STATE	LANDOWNERSHIP - ACRES		TOTAL ACRES
	Private and State	Public Domain				Private and State	Public Domain	
CENTRAL								
Nebraska	45,000	30,000	75,000		New Mexico	5,000	--	5,000
So. Dakota	37,660	1,040	38,700		Oregon	185,000	20,000	205,000
					Utah	234,700	471,400	706,100
WESTERN					Washington	17,000	--	17,000
Arizona	1,025,900	442,000	1,467,900		Wyoming	989,500	166,500	1,156,000
California	371,400	1,800	373,200					
Idaho	269,300	911,500	1,180,800		SOUTHERN			
Montana	2,251,500	942,500	3,194,000		Oklahoma	115,300	--	115,300
Nevada	68,750	103,650	172,400		Texas	5,000	--	5,000

The survey was planned and performed by the Plant Pest Control Division, Agricultural Research Service, in cooperation with various State agencies concerned.



OF AGRICULTURE  
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Division

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ded areas on the map are diagrammatic. Within these areas,

REAGE BY REGIONS, FALL 1964

Orange, Blue and Red)

REGION AND STATE	LANDOWNERSHIP - ACRES		TOTAL ACRES
	Private and State	Public Domain	
New Mexico	5,000	--	5,000
Oregon	185,000	20,000	205,000
Utah	234,700	471,400	706,100
Washington	17,000	--	17,000
Wyoming	989,500	166,500	1,156,000
SOUTHERN			
Oklahoma	115,300	--	115,300
Texas	5,000	--	5,000

n, Agricultural Research Service, in cooperation with various



## HAWAIIAN ACTIVITIES

9

August 21, 1964, PFC established a State office in Hawaii. Office space was assigned the Division by the Hawaii Department of Agriculture in the Honolulu State Building.

The Division participated in the biological control of the southern green stink bug, which was causing economic losses in Hawaii. Some 340,000 Telenomus basalis (stink bug egg parasite) and 9,000 Trichopoda pennipes (adult stink bug parasite) were reared in the PFC Kona insectary and liberated. By the close of the fiscal year, the parasites were generally established over the stink bug infested areas of the State of Hawaii. There were a few isolated infestations on the island of Hawaii that could cause economic loss. Some 700 properties were surveyed for the presence of the stink bug in an effort to determine the best release sites for the parasites.

Contacts have been made with Hawaii State Department of Agriculture, and the Extension Service and the Experiment Station of the University of Hawaii regarding a Cooperative Insect Survey Program. An agreement to have such a program is nearly concluded, but at the present time a definite selection of the Survey Entomologist has not been made.

A very light infestation of the vagrant grasshopper (Schistocerca galea) was found in August 1964 on the small 640-acre man-made Sand Island in the harbor area of Honolulu on the island of Oahu. This grasshopper appeared to be a newcomer to Hawaii, as it seemed to be confined to Sand Island, which is largely government owned and almost devoid of agriculture. A joint PFC-State aerial spray program using low-volume Malathion was undertaken, with eradication of this intruder as the objective. On May 24, 1965, the first application was made. Three applications were made by June 30. This effort will continue into the fiscal year 1966. After three applications the dosage was increased from 8 ounces per acre to 12 ounces per acre; the heavier dosage appears to be more effective. Vegetative growth on the island is quite heavy, hence the higher application rate. This is the first aerial application of an insecticide in an attempt to eradicate an insect pest in the State of Hawaii. It is believed that this may be the first time that an attempt has ever been made to eradicate a grasshopper from any state.

Some assistance was given the State of Hawaii in connection with its giant African snail program. This pest is established in the State, but eradication efforts have kept it pretty well suppressed in some areas, particularly on the islands of Hawaii and Kauai. Periodic surveys are made for this snail.







Hawaii enjoys the position of being so isolated that its climate permits the production of exotic crops. Among them is coffee grown on the Kona Coast of the island of Hawaii. A pest of coffee is the coffee twig borer which occurs on the islands of Oahu and Maui, but as yet it has not been found on the Kona Coast. The coffee twig borer, Hylophorus coarctatus, has many hosts other than coffee. The State is aware of this threat to its coffee production and is considering what to do about it.

Pineapple and sugar cane are the principal crops grown in the State of Hawaii. From the beginning growers of these crops have been self-sufficient with respect to their pest control problems. They are well staffed with specialists and technicians. The growing of macadamia nuts and peach fruit is of interest at the moment. No organized effort to control pests of either commodity is currently being made.

Entomology Research and Plant Pest Control Divisions are preliminarily considering some fruit fly suppression work--perhaps first in the Kaimali, and later in the Hawaiian group. This could entail preliminary chemical reduction of high fly populations, followed by releases of sterile males.



The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present. The author then proceeds to discuss the various factors that have shaped the development of the United States, including the role of the federal government, the influence of the states, and the impact of the people. The paper concludes by emphasizing the need for a continued study of the history of the United States in order to ensure a bright future for the nation.











JAPANESE BEETLE

Fiscal Year 1965

State	Survey and Detection		Control			Regulatory			
			Chemical Acres	No. Parasites Released	Biological	Acres Insp.		Properties Insp.	
	Sites Trapped	Acres Infested				Murs.	Other	Indust.	Other
Arizona	36								
California	33,072								
Colorado	21								
Idaho	3								
Montana	2								
Nevada	25								
New Mexico	14								
Oregon	46								
Washington	14								
Wyoming	6								

\*Not applicable







### EXPORTS AND IMPORTS

Considerable time was spent tracing shipments from infested ships and supervising the treatment of these shipments. In many instances cargo is offloaded and leaves the dock before the khapra beetle is later found in the ship or on the cargo. As more cargo is offloaded at each port of call, a more thorough inspection becomes possible of both the ship and the cargo. There are times when a ship is not found to be infested at the first or second port of call. It has been necessary to trace shipments in practically each state in the Region. There is close liaison between Plant Quarantine Division and Plant Pest Control Division. We know of no established infestation traceable to a foreign shipment since the beginning of the cooperative examination efforts. This speaks highly for the efficient work being done at ports by PQ inspectors.

In the Western Region infestations were found during the fiscal year only in the State of Arizona. There were two infestations found. One of these was in September and involved three of five University of Arizona Farms at Tucson. This infestation represented a volume of 190,312 cubic feet, and it was given a category 2 fumigation the last week of November.

On December 15, 1964, the R&B Feed lot in Yuma was found to be reinfested for the third time since the initial find on the property on January 15, 1960. This property was also given a category 2 fumigation, which was completed Mar 15, involving 581,854 cubic feet in 17 units.

Properties receiving a category 2 fumigation are held under regulation and inspected at 90-day intervals. If no infestation is found on the occasion of these inspections, at the end of one year the premise is recommended for release from regulation.

Trapo-board traps were placed in increasing numbers in most states in the Region. These traps will catch Tragedium specimens even in establishments where sanitation is placed on sanitation, when specimens cannot be found by visual inspection.

With the exception of those states with a history of khapra beetle infestation; i.e., Arizona, California, and New Mexico, inspection was on a detection basis during the fiscal year.

Khapra beetle was last found in California on January 2, 1962, and in New Mexico in 1959.

We are now making apparent freedom from this pest in the Western Region.







# Summary Table

Fiscal Year 1992

State	Survey and Detection		Control	Regulatory		Transportation
	Properties Searched	Positive	Investigation Cubic Feet	Properties Inspected	Regulatory Compliance Costs (Estimated)	
Arizona	3,372	4	172,100	117	\$1,115	0
California	6,210	0	0	0	0	0
Colorado	1	0	0	0	\$0.500	0
New Mexico	302	0	0	0	100	1
Washington	246	0	0	0	0	0

Number of inspections made includes initial and repeat inspections  
 \* Lots treated from Steamship Railroad







## MEXICAN FRUIT FLY

A detection survey program for this pest is carried on annually in California and Arizona.

PPC personnel conducted fruit fly trapping operations in the southern end of Yuma County and in the southern end of the Santa Cruz River Valley of Santa Cruz and Pima Counties from Nogales northward to Tucson. The latter area was trapped until the end of November 1964. Seventy-nine McPhail traps were operated for Mexican fruit flies, and 15 Steiner multiple-lure traps were installed to detect Mediterranean, oriental, and other fruit flies. Trapping was again resumed in May, utilizing 48 McPhail and 18 Steiner traps throughout the balance of the fiscal year. Three Mexican fruit flies were caught in the Nogales area--one on October 20, one on November 3, and one on June 15. Yuma County trapping started November 2 and continued through April. Weekly servicings were made of 13 McPhail and 22 Steiner traps, all with negative results. Fruit from properties in the Santa Cruz River Valley was processed at PQ's hot water larval separation facilities at Nogales. Results were negative.

Surveys in southern California are carried on jointly by the California Department of Agriculture, San Diego Department of Agriculture, and PPC--each agency trapping its own specific area. State personnel trap the most vulnerable area, which lies along the Mexican Border extending from the coast eastward into the mountains. Hosts are plentiful here, and the bulk of the traps (3,000) are placed here, with servicing on a weekly basis. PPC personnel trap the area immediately to the east of the State's operations. This is a mountainous area with some valleys and occasional orchards. Serviced weekly, some 500 traps are operated by PPC. San Diego County places and services weekly 450 traps in an area lying to the north of the other two trapping areas. No native or "wild" Mexican fruit flies were trapped in California during the fiscal year.

A sterile male fly release program initiated by the Mexican Region in the spring of 1964, extending into late fall and resumed in early spring 1965, had an apparent beneficial effect on the Western Region program.

Although bi-weekly fly releases were made in Mexico near Tijuana and Tecate, only 335 marked sterile male flies were recovered in California traps. Such flies released in Tecate and recovered in California were caught within one-half mile of the Border. Elsewhere all California recoveries were made adjacent to the Border except for two--one 9 miles and another  $9\frac{1}{2}$  miles north of the Border.







# MEXICAN FRUIT FLY

Fiscal Year 1965

State	Survey and Detection			Control		Regulatory		
	Traps Installed	Infested		Chemical	Biological	Cin. Acres Treated	Processing Plants	Other
		Properties	Acres	Acres Treated	Flies Released (Units 1,000)			
Arizona	273	3	0	0	0	0	0	0
California	3,907	0	0	0	0	0	0	0







CRICKET CONTROL

Mormon crickets were observed in seven states of the Region, but in most instances were in light to very light numbers. About 1,000 acres were controlled by ranchers in Washington County, Idaho, and several infestations were sprayed in Utah and in Wyoming in conjunction with grasshopper control programs in those states. The crickets occurred in the same areas as grasshoppers, and were very effectively controlled by the application of 8 fluid ounces of Malathion per acre. This material was not tested against migratory crickets, for no bands were found.

At the season's end, heavy concentrations of unbanded crickets were reported in three Idaho counties and in the Wyoming Big Horn Mountains. In all other states only scattered crickets were known to be present.

As in the past several years, all areas known to have consistently harbored Mormon crickets will be periodically surveyed to assure that build-ups will be detected in time to initiate control activity and prevent development of widespread infestations.







# WORM CRICKET

Record year 1965

State	Survey and Detection Acres Infested <sup>a</sup>	Total Acres Infested	
Arizona	8,500		0
Nevada	8,500		0
Wyoming	0		0

\*Adult survey - 1964







PEACH MOSAIC

Cooperative peach mosaic programs are conducted annually in California, Colorado, and Utah. Peaches are not yet a commercially important crop in Arizona and its economy, either as host territory stock or peach mosaic disease prevention as either of these two states. However, peach mosaic disease is found generally where peaches are grown in Arizona and New Mexico, and no suppression of this disease has been attempted in either state for a number of years. Arizona removed its Uniform Peach Mosaic Quarantine, which action may have been ill-timed.

Cooperative control effort has resulted in a drastic reduction in disease incidence in California, Colorado, and Utah. It is not known whether eradication can be achieved. In the San Jacinto test control plot at Lytle Creek, California, where the miticide Dicranon has been used for the past 5 years, there has been no spread of the disease to new trees 3 years old, planted among peach mosaic infected trees. The spray program in the test plot has not eradicated the mite vector of the disease, but it has almost eliminated spread since there have only been three new cases of the disease found during the past ten years--two in 1964 and one in 1965. This is considered quite remarkable, inasmuch as since 1961 none of the infected trees found has been removed. An inspection for the vector mite in the Lytle Creek vector survey plot in 1965 revealed mite-infested buds on only three trees, compared with seven trees with mite-infested buds in 1964. In 1964 it was determined that flowering peach appeared to be a more favored host of the vector mite than the commercial peach trees. A survey for the vector mite on flowering peach was made in the San Jacinto Valley in California in 1965, and the vector was found on 7 properties--2 in Kern County, 2 in Fresno County, and 3 in Tulare County. Buds were collected from 906 properties in 15 counties.

Preliminary work has started on the Navajo Dam on the San Juan River in San Juan County, New Mexico. When completed, some 100,000 acres of Navajo Indian Reservation land will be accessible for irrigation. The Bureau of Indian Affairs is of the opinion that peaches are one of the best crops to grow in that area. For several years the Bureau of Indian Affairs has been trying to get the Navajo Tribal Council to initiate a program to eradicate peach mosaic disease from small orchards and dooryard plantings on the Reservation. So far, they have not been able to get any Tribal Council action on the program. In the past years we have worked with the Bureau of Indian Affairs in training some of their employees to identify the peach mosaic disease in order that they could be qualified to discuss the problem with the Navajos and with the Tribal Council. In this training work







inspections were made in the vicinity of Ship Rock, working with officials at Window Rock. Should peaches be planted on land under irrigation from the Navajo Dam, and if the peach mosaic infected trees in the area are not removed, it will not be a profitable venture for the Navajos.

Nursery inspections were made in California and Colorado, and budwood inspection was made in Delta County, Colorado. One request for budwood from Mesa County was rejected because the buds were to be cut in a generally infected area.

Budwood of the Early Giant Elberta variety originating in Mesa County, Colorado, was tested for peach mosaic and released on negative results.

Well-timed applications of the proper insecticide with adequate frequency may "break the back" of the single known vector population in any area of interest. This chemical suppression plus systematic removal of infected trees supports some hope for eventual eradication of peach mosaic.







# PEACH NCSA/C

Final Year (2022)

State	Survey and Infection				Control		Regulatory		
	Proprietary		Non-Proprietary		Wheat	Barley	Wheat Inspected		Barley Inspected
	Recovered	Infected	Recovered	Infected			Number	Barley	
California	2,484	40	1,376,614	123	123	208	208	208	208
Colorado	1,238	124	754,715	256	256	2	2	402	402
Utah	1,505	6	51,847	12	12	0	0	0	0

\* Represents nurseries

\*\*Represents acres in the environs







## PINK BOLLWORM

Two of our four cotton-producing states (California and Nevada) and the two westernmost counties of Arizona are still not known to be infested with pink bollworm. The remainder of Arizona and all of New Mexico are considered generally infested. The regulatory status of central Arizona was formally changed from "eradication" to "generally infested" during the year. Populations of this pest continued to build up in central and eastern Arizona and in several areas of New Mexico, most notable of which were the southern half of Eddy County, scattered fields in Chaves County, and the Columbus community of Luna County. Meetings to organize voluntary cultural control were held in Eddy County, but with less success than resulted from a similar effort last year. On a cooperative basis we and the New Mexico Department of Agriculture joined forces to carry out surveys for this pest and to enforce regulations pertaining to the movement of relatively large quantities of commodities requiring treatment and certification.

Nevada surveys involved the operation of seven light traps throughout the season and the examination of gin trash from every field in the two cotton-growing communities of that state.

The California Department of Agriculture, County Departments of Agriculture, and the Plant Pest Control Division ran cooperative surveys in search of pink bollworm. A total of 137 light traps and 49 sex-lure traps was operated; field inspections were conducted on 1,301 properties; 28,440 bushels of gin trash were examined, and 19,728 lint cleaner examinations were made.

Our survey activities in Arizona during the first quarter of the fiscal year involved the operation of 208 sex-lure traps, and to obtain comparisons, the operation of 19 blacklight traps. The bulk of the sex-lure traps (160) was located in Yuma County, and the remainder in Maricopa, Pinal, and Gila Counties. When trapping was stopped in mid-November, 1,537 moths had been caught, all but 17 in sex-lure traps. For the first time in all Arizona trapping history, a moth was caught in a pass area remote from any Thurberia colony. Trapping was started again in early March 1965, and was in operation at the end of June with negative results. All 220 sex-lure traps this season were in Yuma County.

Starting in mid-September and continuing for four months, 13 gin trash machines were operated in a cooperative program involving the Arizona Commission of Agriculture, the cotton growers, and PPC. A total of 94,828 bushels of gin trash was examined,







and 32,793 lint cleaner inspections were made. Although no attempt was made to find all infestations, surveys showed infestations at 48 locations in Maricopa, Pima, and Pinal Counties, involving 178 properties and 13,919 acres of cotton.

PPC regulatory activities were scaled down to involve the enforcement of Federal Domestic Quarantine No. 52 regulations.







# PINK BOLLWORM

Fiscal Year 1965

State	Survey and Detection				Control		Regulatory	
	Surveyed		Infested		Mechanical		Properties Inspected	
	Properties	Acres	Properties	Acres	Acres		Industrial	Other
Arizona	1,977	55,565	257	29,594	321,215		8,706*	2*
California	1,301	0	0	0	0		0	0
New Mexico	0	0	0	0	0		71*	0

\*Includes initial and repeat inspections







## FLAAR FRS- SURVAYS

Cooperative Economic Insect Survey

The number of active cooperative agreements in the Western Region remained at six during fiscal year 1965. Hawaii has indicated interest in the program, and initial steps have been taken to develop a cooperative agreement there.

During April two workshops were held in cooperation with states--one in Portland, Oregon, with Idaho, Oregon, and Washington participating; the second in Golden, Colorado, which was a joint undertaking by Colorado and Wyoming state cooperators. Both workshops were well received and attended.

Detection efforts by FRS personnel during the year included observations for Cereal Leaf Beetle in Arizona, Colorado, and Wyoming; Peach Fly in Utah; Citrus Black Fly, Imported Fire Ant, White-Fringed Bees, and Sweet Potato Weevil in Arizona; Gypsy Moth in Utah.

During the year meetings with cooperators or survey advisory committees to discuss contract renewal and work plans were held in Arizona, California, Colorado, Nevada, New Mexico, and Wyoming.

FRS exhibited an Insect Detection display at the Arizona State Fair held November 6-15 in Phoenix.

Beet Leafhopper - *Circulifer tenellus*

Adult and nymphal surveys for beet leafhopper were conducted in southwestern counties of Idaho during the spring of 1965. The adult survey indicated both beet plant and beet leafhopper populations low, with the exception of two small areas, where follow-up nymphal surveys conducted just prior to control proved that populations had decreased to economic numbers.

A series of three surveys was made in the beet leafhopper spring-breeding areas of southwestern Arizona, eastern California, southern Nevada and southeastern Utah. Beet leafhopper populations were low over most of the area, with a few moderate-to-heavy areas, indicating a possible economic build-up and migration to the north. Current condition reports were prepared and sent to cooperators and simultaneously published in the Cooperative Economic Insect Report. Beet leafhopper surveys in south central New Mexico were made by SFRS personnel.







A beet leafhopper survey was conducted in Washakie County, Wyoming, where severe losses to sugar beets had occurred in previous years due to curly top.

As a result of the survey, the growers followed recommendations to control the insect which was found in weedy growth, principally on Kochia sp bordering fields on ditch banks, roadsides, and wasteland areas.

The survey was in cooperation with the Wyoming Extension Service and the Wyoming Department of Agriculture. PPC provided technical assistance in survey methods and aerial application of pesticides in accordance with recommendations in Agricultural Handbook #290. Approximately 5,000 acres were treated with aircraft using Malathion.

#### European Pine Shoot Moth - *Rhyacionia buoliana* (Schiff)

The U. S. Forest Service and the Washington Department of Natural Resources are continuing their high interest in delimiting infested areas of European pine shoot moth. The Washington Department of Agriculture is assisting in nursery inspection and regulatory activities. Each of the two first-named agencies was interested in PPC survey assistance, especially for nursery inspections. However, sufficient State Horticultural Inspectors were available, and it was decided by the State Department of Agriculture that they would be able to make the necessary surveys alone. This year was the first year without a systematic area survey in the formerly infested Spokane Valley, Spokane County. However, no pine shoot moths or evidence of their occurrence were noted during inspection visits to the area.

The Forest Service has established a grant at Washington State University for European pine shoot moth research. These studies will be conducted by two staff members of the Department of Entomology and will consist of (1) nutritional studies relative to the rearing of pine shoot moth on artificial media; and (2) a companion study of male sterilization as a control measure.

Full-scale nursery inspections by the Oregon Department of Agriculture were again conducted in that state to detect possible infestations of European pine shoot moth. By request, PPC again participated with the State in this survey. No nursery infestations of the pest were located.

The Oregon Forestry Department and the U. S. Forest Service cooperated in another intensive, foot-scouting survey in the Portland area and environs for pine shoot moth. Also, small



THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
CHICAGO, ILLINOIS 60637

RECEIVED: [illegible]  
FROM: [illegible]  
SUBJECT: [illegible]

Dear [illegible]:  
I have received your letter of [illegible] and am  
pleased to hear that you are interested in  
the work of the Department of Chemistry at the  
University of Chicago.

The Department of Chemistry at the University of Chicago  
is one of the largest and most active in the United States.  
It is headed by Professor [illegible], who is a member of the  
National Academy of Sciences. The Department has a long  
history of research in many fields of chemistry, including  
organic, inorganic, physical, and analytical chemistry.  
We have a large number of excellent faculty members and  
a high level of equipment. We are currently working on a  
number of important projects, and we are always looking for  
new people to join our staff.

If you are interested in the work of the Department,  
I would be glad to discuss it with you. Please write to me  
at the address given above, and I will be happy to  
reply to you as soon as possible.

Sincerely,  
[illegible]  
Professor of Chemistry

Enclosed is a copy of the [illegible] of the Department of  
Chemistry at the University of Chicago. I hope you will find  
it of interest.



units of State and Federal employees inspected susceptible trees in other areas of the State. A find of particular interest was an infested pine tree growing in a decorative planting along a new highway. The trees had been purchased from a nursery in the Seattle, Washington, area, which is generally infested with pine shoot moth.

PPC was frequently called upon by the State agricultural inspectors for assistance in checking pine shipments for the European pine shoot moth. This work was accomplished while working on regular program work. The agricultural inspectors burned shipments of pine that had not been fumigated prior to shipment, or returned the pines to the shipper at his expense.

#### Hall Scale - *Nilotaspis halli* (Green)

Since 1958, when quarantine restrictions were removed, inspections for Hall scale in California have been regulated by available time after attention was given to other programs with greater priority.

While work on Hall scale surveys has been limited, areas considered likely locations for surviving scale were inspected in Butte and Yolo Counties, for a total of 4,769 hosts on 907 properties.

The finding of another lightly infested almond seedling in the Stilson Canyon, Butte County, February 1965, was not entirely unexpected, nor reason for great concern, because of the density of vegetation and remoteness of the area.

Currently, plans are being made for cooperative Hall scale surveys by PPC, State of California, and county personnel during the 1966 fiscal year. It is felt the lapse of time since abandonment as a project should have allowed for more readily detectable build-ups of any scale that may have eluded detection and treatment.

#### Potato Psyllid - *Paratrioza cockerelli*

Survey for potato psyllid was made in the spring-breeding areas of Arizona, California, and New Mexico during April. Status reports were immediately prepared and sent to cooperators in northern areas. Potato psyllid populations were light over most of the area. The survey in New Mexico was made by Southern Region personnel.







State Survey Coordinators  
for Economic Insect Survey Reports

Arizona	Dr. James W. Hickey, Extension Entomologist University of Arizona, Phoenix 85005
California	Mr. Robert W. Harger, Chief, Bureau of Entomology State Department of Agriculture, Sacramento 95814
Colorado	Dr. Leslie E. Daniels, Head, Department of Entomology, Colorado State University Ft. Collins 80521
Hawaii	Hawaiian Entomological Society, Attention: Secretary 1527 Keeaumoku Street, Honolulu 96822
Idaho	Dr. G. V. Menis, Head, Department of Entomology University of Idaho, Moscow 83843
Montana	Dr. James H. Pepper, Head, Department of Zoology and Entomology, Montana State College, Bozeman 59715
Nevada	Mr. Lee H. Furge, Director, Division of Plant Industry, State Department of Agriculture, Reno 89504
New Mexico	Mr. Dallas Eklund, Director, New Mexico Department of Agriculture, New Mexico State University University Park 88070
Oregon	Mr. Hugh Taylor, Chief, Division of Plant Industry State Department of Agriculture, Salem 97310
Utah	Dr. George F. Knowlton, Extension Entomologist Utah State University, Logan 84321
Washington	Dr. Bruce S. Telford, Chairman, Department of Entomology, Washington State University Pullman 99164
Wyoming	Dr. Robert E. Pfadt, Head, Department of Entomology University of Wyoming, Laramie 82071







Survey Entomologists

Arizona	Mr. Dale G. Fullerton Arizona Commission of Agriculture and Horticulture	Phoenix
California	Mr. Ronald Hawthorne State Department of Agriculture	Sacramento
Colorado	Mr. Leonard E. Jenkins Colorado State University	Ft. Collins
Nevada	Mr. Robert C. Bechtel State Department of Agriculture	Reno
Wyoming	Mr. William D. Marks University of Wyoming	Laramie







## WESTERN COTTON WEEVIL

During this fiscal year, occurrence surveys for boll weevil were continued in Arizona, while detection surveys in New Mexico and California brought negative results. A definite westward movement of the pest was evident in Yuma County as finds were made in the Yuma Valley, North Gila Valley, the west edge of Coach Valley, and the Salome community. The first three of these areas are bordered on the west by the Colorado River.

The Mexican Department of Agriculture and PPC personnel made weevil surveys in the Yuma border counties of Doña Ana, Otero, Eddy, Lea, and Brewster, and also in a cotton-growing area in Yuma County on the Mexican border. Surveys involved field inspection and one month's operation of a gin trash machine.

In California detection surveys were made in Kern, Imperial, Palo Verde, and San Joaquin Valleys. Square and boll examination was done during the growing season, and after harvest bolls were examined until shredding and plowing was done. In the San Joaquin Valley, bolls were collected during late harvest and examined in the laboratory. At Kern, winter survey of field debris was made, utilizing gin trash machines and warming tables. In April, as new host forms appeared, field inspection was resumed. Following reasonably successful field trials in weevil-infested fields in Arizona, a "D-vac" machine, powered by a 1½-HP two-cycle motor, was utilized at Kern for field examination. In that area this machine recovered numerous species of cotton insects, including several species of weevil, none being the western cotton weevil.

In Arizona a delimiting survey was started in July in Maricopa, Pima, Pinal, Santa Cruz, and Yuma Counties, and a special survey was expanded to provide EET with development data. The latter survey was made in strategically located, selected fields in the suspect weevil belt stretching from Nogales northward through Pima, Pinal, and Maricopa Counties, and westward to Wellton in Yuma County.

A "top-crop" survey was started late in October in Cochise, Santa Cruz, Pima, and Pinal Counties and extended early in November into Maricopa and Yuma Counties. Surveys were terminated in late November in the southeastern areas, but continued until mid-January in Yuma County.

All gin trash examined for pink bollworm was simultaneously screened for boll weevil. A number of fields were found infested by this method.







Boll weevil finds by all methods disclosed the following:

<u>County</u>	<u>Infested Properties</u>	<u>Infested Acres</u>
Cochise	1	20
Maricopa	56	7,559
Pima	144	7,605
Pinal	239	17,013
Santa Cruz	44	1,549
Yuma	44	4,453
Total	<u>528</u>	<u>38,199</u>

It should be pointed out that in obtaining the above information no attempt was made to locate all infested fields, but only to delineate distribution of the boll weevil throughout Arizona.

In connection with the surveys conducted with ENT, PFC employees made marginal debris surveys from January 5-15 in 25 cotton fields (5 in each county) in Maricopa, Pima, Pinal, Santa Cruz, and Yuma Counties. Ten square-yard samples of noncotton surface debris from each of the field margins were processed through gin trash machines and over warming tables, with negative results. Late in March similar marginal debris surveys were made in Maricopa and Pinal Counties and in Pima, Santa Cruz, and Yuma Counties in early April, again with negative results.

A cooperative 6-week-long seedling survey was started April 6 in southern and western Arizona, in which PFC inspectors supervised ENT workers in examining 40 selected fields. No weevils were recovered. Starting May 24 and running through June, a similarly manned square survey was conducted in 25 selected fields in Maricopa, Pima, Pinal, Santa Cruz, and Yuma Counties. This survey resulted in the recovery of a weevil in Yuma County on June 3 and one in Maricopa County on June 14, and as of the end of June almost 60 feeding scars or egg-laying punctures had been found.

A special inspection for cotton weevil incidence was made October 5 and 6 in an 80-acre field near Aztec in eastern Yuma County. Five hundred squares examined in 140 lineal feet disclosed 475 adult weevils, 2,560 feeding punctures, and 4,280 egg-laying punctures.

The extent of infestation in this field afforded the opportunity to test the effectiveness of low-volume Malathion treatment under Arizona conditions. Four applications at 6-day intervals at a dosage rate of 10 fluid ounces of technical Malathion per acre were made to half of the above field, starting on October 27. Daily population counts extending over a 24-day period disclosed an 83 percent reduction in weevils present.







Starting November 14, a second series of 4 applications at 6-day intervals, using 16 fluid ounces of technical Malathion per acre, was conducted. Daily population counts over a 23-day period indicated a 96.6 percent reduction in populations.







# WESTERN COTTON WEEVIL

Fiscal Year 1965

State	Survey and Detection				Control	
	Surveyed		Infested		Acres Treated	
	Properties	Acres	Properties	Acres	Initial	Aggregate
Arizona	17,762	136,540	528	38,199	0	0
California	912	32,699	0	0	0	0
New Mexico	352	2,939	0	0	0	0



























